

# Nature *Magazine*

OCTOBER 1954

VOLUME 47 NUMBER 8

50 Cents





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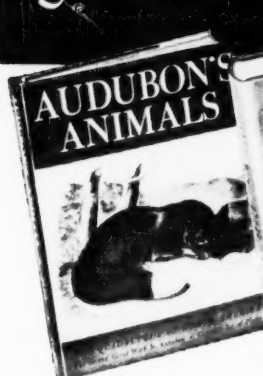
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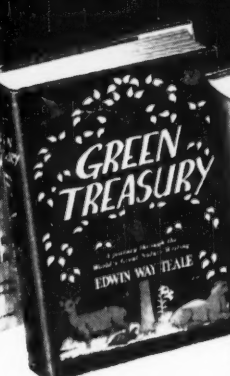
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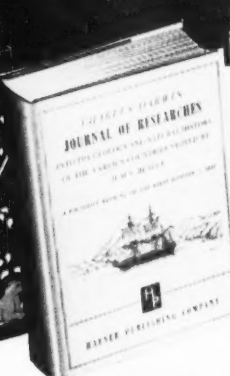
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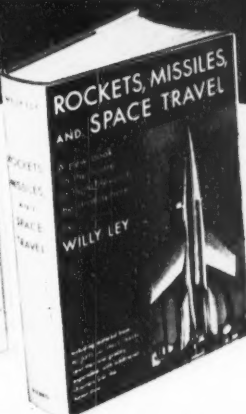
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# Nature in Print

By HOWARD ZAHNISER

**M**OST men, after they have matured, find cheerfulness no longer a mere matter of course, but rather a matter of creativity, write A. and E. Matson in an introductory essay to their discourses and anthology in *Adventures in Tranquillity*. The Matsons know cheerfulness as an art, creative cheerfulness, and define it as "harmonious development of our various faculties as human beings and a practical recognition of the equal rights of all other men to the same development." They outline the conquest of gloom through "certain valiancies of the soul"—sympathy, humor, perspective-mindedness, patience, perseverance, and courage. Esther Matson herself has compiled an "anthology of restorative thoughts," and this collection of the wisdom of those philosophers of tranquillity, who have also been poets, nicely completes a thin volume that comes graciously indeed into our modern lives at a most propitious time.

What an interesting thing it is, in the title of such a volume, to make tranquillity an area of adventure! Yet so it is, indeed, in our living. Are we not, on the one hand, in the midst of routines that often seem to reduce our lives to a humdrum sameness of sureness and security—and, on the other hand, in such a dither of pulsation and constant go-go that we know all too little of peace and quiet? Our lives need adventure, and surely our souls long for tranquillity.

Perhaps this is a condition of our urban mechanized lives. It surely does seem to be expressed again and again in the experiences of those who, in one way or another, venture out of city living, into some sort

of satisfaction that makes their experiences interesting to those who, still in the cities, find their own adventures in quiet reading. Thus it was not surprising, but rather characteristic of our conditions, to find Annette Jackson's book, *My Life in the Maine Woods*, prominently reviewed in the New York City daily press. There is intrinsic interest, of course, in the experiences of this game warden's wife—and they are engagingly related—but I dare say that the significance that brings them into a book pertains to our city strains and needs for relief.

"People who have lived in the timberland for a long time," Mrs. Jackson believes, "rarely show a trace of nervousness or of dissatisfaction with their way of life. Their hands are steady, their gait lively and sure. They are calm, contented, and happy."

But, she goes on to emphasize, "This can hardly be said of city people."

In a most interesting chapter on acquaintances in the woods country, a chapter entitled "Old-timers," Mrs. Jackson, many pages later, returns to this theme.

"My study of these wilderness characters," she writes in the closing paragraph of this chapter, "leads me to the conclusion that they are very slowly in comparison to people who live in the city. They are people who are utterly without worries. Even the changing seasons do not concern them particularly. The winter's snow is no more a bother to them than the summer grass. You could not very well call them woods-queer. They have simply made and stuck to their choice of a way of life."

Mrs. Jackson may, in truth, be idealizing in reminiscence, yet it is significant that she thus makes an appeal to her readers—and somehow or other thus ministers to their needs. And, while she

is narrative rather than philosophical, a conversationalist rather than a moralist, she expresses occasionally most effectively some of the explanation for the difference between the two kinds of living that are in contrast. Part of this explanation is surely in what we call time, for our lives in the complications of city living, our meeting by appointment, and our individual fitting of activity into our urban patterns—are all governed by clocks, and it is to our clocks that we look for our knowledge of time.

Not so in the woods, as Mrs. Jackson perceives—and impressively relates.

"In the woods," she writes, "time is a snowstorm in winter, a downpour of rain, a day in the spring, mosquitoes, black flies, the brook in which you fish, a sunset, moonlight, people you expect to see. Time may be a dry spell or a forest fire, a freeze-up or a drifting of ice. On the whole, time does not trot right along. Often it stops for a while and sometimes it backtracks on its trail. It lopes along in the winter and hustles in the spring and summer. Anybody who has lived in the woods knows how easy it is to lose all trace of time in terms of days. It has a way of doing strange things to people who live in the woods all alone. When you live by yourself for a long while, time begins to seem like a pail with a hole in the bottom. You can draw up water

with it, but the water leaks out before you can make use of it."

But time does trot right along in the city, and on schedule. Only in the sickroom does time in the great city ever seem to release its compulsions. We have achieved an independence from the natural fluctuations that sometimes slow us up almost to a stopping, but we have suffered, instead, a dependence on clocks. What sacrifices we make are only occasionally intimated by such people as Annette Jackson.

In her discussion of "Winter in the Woods," pages away from her earlier comment, she exclaims again:

"One of the richest pleasures I know of is being housebound because of the wild winter wea-

ther outside. With your family about you, a good book on your lap, a roaring fire in the stove, and a good hot dinner in prospect—you are richer than a millionaire. There is no use in looking at the clock during a blizzard, for then time means nothing. In the wilderness, in an odd way, this sense of timelessness occurs at other times of the year as well. Many times, watching my children play on the floor by the fire, I have wished the blizzard would last for days longer."

Harlan Hubbard has similarly brought a tranquil adventure into our reading with his book *Shanty Boat*, an account of the life he—an artist—and his wife, both of them musicians, spent in their houseboat along the Ohio River, and eventually in "the near ecstasy of drifting" down the Mississippi. It was when "time became as smooth and even as the current outside our windows" that they began to realize their "true aims in coming to the river." One of these aims was to do his painting and drawing, another was simply "to live with the river" and thus come to know it intimately, but a principal motivation was apparently the "chance for a more unhampered life than any other accessible region."

"I had no theories to prove" writes Mr. Hubbard. "I merely wanted to try living by my own hands, independent as far as possible from a division of labor in which the participant loses most of the pleasure of making and growing things for himself. I wanted to bring in my own fuel and smell its sweet smoke as it burned on the hearth I had made. I wanted to grow my own food, catch it in the river, or forage after it. In short, I wanted to do as much as I could for myself, because I had already realized from partial experience the inexpressible joy for so doing."

## Autumnal

By GERHARD FRIEDRICH

These too must drift at last into the night  
Of withered leaves, must mingle with the rain  
Of worlds of color—scarlet, bronze, and gold—  
That burned within my blood, my bones, my brain,  
That burned, but now the ground haze creeping up  
Stone-studded slopes takes the warm light away,  
And shadowed flights of migratory birds  
Fade from another sky of Chinese gray,  
Fade, fade, and with the unremitting deep  
Shift in the season countless loves are lost  
To time and to the white and timeless sleep,  
Touched by the solemn mystery of frost.  
So asters whose small fires are overspent  
Spell to the wind the wisdom of consent.



We sense thus, in these samplings, the quality of these books rather than summarize their substance. But both, to merit such samplings, are indeed interesting volumes. Mrs. Jackson's accounts of her trips with her warden husband, her descriptions of her recipes, as well as her characterizations of her country and its inhabitants, are reading of deep interest. Harlan Hubbard's chronicle of his building of his shantyboat, its arrangements, his life on it, and his journey on the river, has been one of the most interesting and satisfying books that I have read in some time. My eight-year-old Edward, and his older sisters and brother, listened at bedtime one evening to the rest of one of Harlan Hubbard's chapters when I read it aloud simply to secure to myself the privilege thus of "finishing the chapter," and from then on the book was in bedtime demand so long as it lasted—especially from Edward. Meanwhile my wife was engrossed in Annette Jackson's volume and heartily commending it to me. There is no question that with these books there comes into our urban home, a sense of adventure, nor any question that this leads into a most satisfying recollection in tranquility. In their reading and in their suggestions for our own experiences in vacation, perhaps in experiment, they provide material for our own creative activity for cheerfulness, and thus serve an art of our own!

*Adventures in Tranquility: An Introductory Essay and an Anthology.* By A. and E. Matson. New York: Philosophical Library. 1954. 119 pp. (5½ by 8¾ in.) with index of authors quoted for the anthology. \$2.75.

*My Life in the Maine Woods: A Game Warden's Wife in the Allagash Country.* By Annette Jackson. New York: W. W. Norton & Co. 1954. 236 pp. (5¾ by 8½ in.) with end-papers map and 11 chapter-head and title-page drawings by Henry Bugbee Kane. \$3.50.

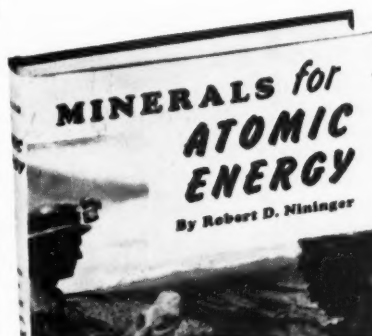
*Shanty Boat.* By Harlan Hubbard. New York: Dodd, Mead & Co. 1953. 352 pp. (5¾ by 8½ in.) with end-papers map and 33 drawings by the author. \$4.

### Indian Corn

*Indian Corn in Old America.* By Paul Weatherwax. New York: The Macmillan Company. 253 pages. Illustrated. \$7.50.

In this book the author goes back to the remote history of Indian corn as it was grown and used before the discovery of the New World. He then follows the effects of the introduction of corn to Europe by Columbus and its impact on social, economic, religious and cultural institutions. Concluding pages deal with the development of the corn plant and the debt modern man owes the American Indian. The author is Professor of Botany at the University of Indiana, and he has written a fascinating and valuable account of this essential plant.

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## IN THIS ISSUE

October, 1954

Vol. 47, No. 8

Nature in Print	Howard Zahniser	394
Autumnal (Poem)	Gerhard Friedrich	394
Roadside Raiders	Frank E. Egler	398
Contents Noted	R. W. W.	399
The Teeter Bird (Poem)	Theo. H. Scheffer	400
Nearest Thing to A Mermaid	James E. Lawrence	401
World of the Waterway	Virginia S. Eifert	405
Jugs of the Potter Wasp	George A. Smith	408
Empusa, Fly-Killing Fungus	Lester E. Harris, Jr.	409
Fiddlers	Hugo H. Schroder	410
Better-Bred Trees	Dorothy M. Martin	411
Gold Specs and Black Sideburns	George A. Smith	413
"The Goblin Gates" Refound	Robert L. Wood	414
Fungus of the Desert	Nell Murbarger	416
Clouds in the Sky	Carroll Lane Fenton and Mildred Adams Fenton	417
Helping the Date Palm Make	Dwight Watkins	423
Dates	Dwight Watkins	425
Editorial		425
Antioch's Glen Helen	Margaret M. Jackson	426
Bells of Erin	Ralph J. Donahue	428
Grunt Fish	James Wood	428
Of Bugs and Boys	Glenn W. Kerfoot	429
Tufted Titmouse (Poem)	Ray Romine	430
Elliott Coues	W. L. McAtee	431
Loon Lake (Poem)	Sara King Carleton	432
Knowing Wildlife on Its Terms	Morley Cooper	433
Desire (Poem)	John Gallinari Whidding	435
The North Star and the Dippers	Isabel M. Lewis	436
The Night of the Autumnal Equinox (Poem)	Florence Schneider	437
The School Page	E. Laurence Palmer	438
Camera Trails	Edna Hoffman Evans	440
Under the Microscope	Julian D. Corrington	446

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NATURE MAGAZINE is published monthly, October to May, inclusive, bi-monthly, June to September, inclusive, by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C., U. S. A., and accepted for mailing purposes at the special flat rate of postage provided for in the United States Postal Act of October 3, 1917, and February 28, 1925. \$4 a year; foreign, \$5.00. Additional entry Easton, Pa.

Publication and Editorial Office, 1214 16th Street, N. W., Washington 6, D. C. Additional office of publication, Easton, Pa.

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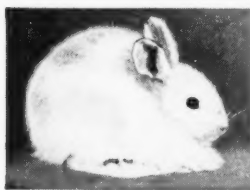
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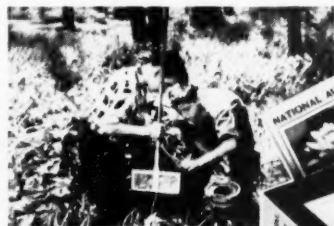
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## ROADSIDE RAIDERS

### The Men Who Spurn Ecology in the Name of "Brush Control"

By FRANK E. EGLER

Research Associate, The American  
Museum of Natural History, Depart-  
ment of Conservation and General  
Ecology

*Condensation of a talk prepared as a part of a symposium organized by the American Nature Study Society on "Some Practical Applications of Ecology" at its annual meeting, Dec. 9, 1953, in conjunction with Boston sessions of A.A.A.S. Dr. Egler, active in the scientific study of vegetation, is Chairman of the Museum's Committee for Chemical Brush Control Recommendations for Rightofways. Further information about Dr. Egler's work and about the 23-minute color, sound film entitled "Rightofway Brush Control" may be obtained from the Museum, Central Park West at 79th Street, New York, 24, New York.*

THE ecological problem of managing the component of unwanted brush on the roadsides and along the rightofways of telephone and power companies in forested regions, is becoming increasingly serious. The aggregate acreage is enormous; in some States equal to an average entire county. Yet most of this huge acreage is being abused and misused in ways contrary to ecological knowledge and in disavowal of science.

Were the destruction, the harm, and the unnecessary expense, solely restricted to the land owner, we might dismiss it with a shrug. But part of our national heritage is involved—the populations of small birds and other wildlife; wild flowers and the beauty of our roadsides; fire hazards of the vegetation. Thus it is a citizen's problem; a local community problem. We know how ecology can be applied. It is up to you, collectively and individually, to see that it is applied in your local region.

**The Problem—"Brush"** is a normal phenomenon, a half-way stage in Nature's process of re-covering land with the forest it once bore. There are many places where we do not want brush. We do not want it on our lawns, our gardens, our orchards, or our pastures. Neither is it wanted on parts of roadsides where it would overhang the pavement or obstruct vision. It cannot be tolerated on rightofways of power and phone lines where it would grow into the wires, disrupt service, and make repairs difficult. Hand-cutting of brush has become increasingly expensive; is now all but prohibitive.

In 1945, certain herbicides came into use. These were "selective" in that some

plants were resistant, such as grasses, and thus the soil was not bared and sterilized. The chemicals include the 2,4-D and 2,4,5-T compounds, and ammonium sulfamate, none of which are poisonous to animals—although unnecessary destruction of animal habitat can be worse than killing the animals themselves. Such sprays could be applied broadcast, with power equipment. They resulted in a rather striking kill-to-ground, although by no means a good root-kill. But the subsequent grassland was rather pleasing to the eye, and costs were less than hand-cutting. So such technique has certain attractions. Manufacturers and contractors vied with each other in promotional programs. Spray-happy, with a true American zeal for big equipment and for chemicals, they did not look, and to a great extent are not looking, beyond the immediate present.

**What Is Being Done**—One has only to drive through the States that are not in grassland or desert to realize the tremendous mileage now being subjected to indiscriminate blanket-spraying. Mile after mile of both State highways and secondary roads are scared in summer with unsightly scorching of all flowering herbs and shrubs, ruining habitat for birds and mammals. Admitting that brush control is necessary, is this destruction really necessary? The answer is "no." It is frequently an unnecessary expense to the landowner and the taxpayer, and an unnecessary destruction of community values.

Grassland is being produced where it is as superfluous as a deep-freeze among the Eskimos. Often roadside vegetation has been sprayed back for 20, 25, or more feet. Some grassland is needed near the shoulder of the road, but next to this ornamental shrubs are usually planted by highway landscapers, and there it is most logical to preserve existing viburnums, laurels, azaleas, and other native shrubs.

In distinct contrast to the indiscriminate blanket-spraying, a different technique involves selective basal spraying only of those plants that are not wanted. This work is usually done in winter, and with small, knapsack sprayers. One might think this would be excessive in its man-hour requirements, and would require more highly trained personnel. Such spraying results in a slower, but more effective, root-kill of woody plants. Actually, after four years of commercial operations, the technique is found to be on a competitive price basis for all ordinary kinds of brush. It is in the post-spraying vegetation that this technique differs completely, not resulting in grassland, but in a mixed cover of flowers, and flowering and berry-bearing shrubs. Only the unwanted young trees are killed out.

**Ecological Principles Involved**—Using spraying as an ecological "tool," we may, for approximately similar costs,

produce grassland relatively devoid of broad-leaved herbs, or a mixture of shrubs and herbs with what grasses may be among them. Scientific information is already available as to which vegetation types are cheapest to maintain. The stability of the plant community must be considered, and its resistance to invasion by unwanted trees. Indiscriminate spraying so widely practised on the highways of the nation is in a large measure unjustified from an economic viewpoint, even if the numerous conservation values were not also involved. Persistence in advocating it is essentially a negation of science.

**Supporting Scientific Evidence**—Botanical evidence indicating the varying stability of different non-forest plant communities is scattered throughout the technical literature. Foresters in the Southeast, for example, have long realized that reforestation is slowed down when a shrub stage replaces the grass. Elsewhere, foresters have found various situations where they do not get tree seedlings, as with the ericaceous "slicks" of the southern Appalachians. Where the forester is dissatisfied, the roadside manager can take advantage.

On the Ten Mile River Scout Camps, Sullivan County, New York, a fireline has been covered with low shrubs since 1936, with tree seedlings unable to enter. Specific rightofway studies are in progress on 22 research areas in 11 eastern States from Florida to Vermont. Furthermore, commercial selective spraying, according to this American Museum System, has now extended south to Alabama, and into the middlewest in Illinois and Wisconsin. It is from these numerous sources that one can make generalizations, even while being conscious of certain local exceptions due to the never-ending variety in the regional plant communities.

**What Naturalists Can Do**—Naturalists have a large stake in this problem. Roadsides in the country are a never-ending source of study and pleasure. They provide food and cover for quail, grouse, pheasant and song birds. They are alive with a continual succession of wild flowers throughout the season. You need not let them be destroyed. Get acquainted with the local highway commissioner, and the local telephone and power companies. More likely than not, they are unfamiliar with the botanical pros and cons of the different kinds of sprayings. Do not think that you are asking a favor. By satisfying your own interests, they will not only cut costs for themselves, they will better serve the interests of the public, and such relations have a tangible value to them. It is unwise to wait until indiscriminate spraying is already done. Then, not only is damage done, but faces must be saved, regardless of how "right" you may be. Save your country roadsides. The responsibility is yours.



# Contents Noted

NEARLY thirty years ago The American Nature Association cooperated actively in the Outdoor Good Manners campaign then spearheaded by the General Federation of Women's Clubs. We offered prizes to professional and amateurs for outstanding cartoons on bad and good behavior outdoors, and otherwise produced and distributed educational material. American manners outdoors have not improved in the past three decades, and there has now been created an organization known as Keep America Beautiful, Inc., "a national public service organization for the elimination of litter." It is being supported by American business "on the premise that a clean outdoor America is good for business as well as for the public welfare." It has the blessing of many national, non-commercial organizations aroused by the litter problem, including The American Nature Association. Particularly active are the National Council of State Garden Clubs and some chapters of the Izaak Walton League of America. It is a large task of public education that confronts KAB, because thoughtless littering of highway environs and the outdoors generally is a serious national problem; a problem that involves for its solution prevention and disposal of litter. The task is to awaken the American conscience; to establish the "litterbug" as a reprehensible character. The job *can* be done, but it will take money and a wise campaign. KAB appears to be assured of both weapons against deliberate vandalism and thoughtlessness. It is to be hoped, also, that we may eventually look for greater regard for the amenities on the part of users of all sorts of signs on the landscape, and on the part of roadside enterprises that to such an extent litter the highways with hideous and unattractive structures.

WE MUST add to the things-we-never-knew-before department the fact that *Cypripedium reginae*, and, perhaps, others of the lady's-slippers may act upon humans much like poison ivy and poison sumac. Mabel James of Holland, New York, picked up a lady's-slipper that a passing deer had picked and pulled apart the faded flower to show to her class. Soon afterwards she had a severe dermatitis. She wrote us about this, thus sending us to our library to consult various volumes. In Correll's *Native Orchids of North America* we found that "the short, coarse, glandular hairs which cover the vegetative parts of this species [*C. reginae*] and that of the Yellow Lady's-slipper are capable of causing severe cases of dermatitis. . ." In 1895 MacDougal found that the poisonous character seemed to increase with the degree of maturity of the plants, and a maximum effect was reached during the formation of the capsules. Plant tissues of the lady's-

slippers were found to contain needle-sharp crystals that seemed to protect them from grazing animals. Wild flower conservationists have long urged leaving the lady's-slippers alone, and there seems to be an added reason for doing so besides conservation of these wild flowers, which have been greatly reduced in numbers by man's encroachment on their natural habitat.

AFTER three years of undercover work by game management agents of the U. S. Fish and Wildlife Service and wardens of the California Department of Fish and Game, a double-barreled raid netted seventeen market hunters and nine San Francisco Bay area restaurateurs as "duckleggers." The hunters had been killing wild ducks illegally and the restaurant men had been buying them for an average of \$1.25 apiece. The violators, brought into court, faced an angry Federal judge, Oliver J. Carter, who assessed \$4900 in fines, handed out an aggregate of six years and nine months in jail sentences and seven years of probation. The judge said that the ringleader of the gang "was raised in an attitude of complete moral blindness on the question of game laws. This is a matter for which his community was partially responsible." The community had a blind spot, also, he asserted, so far as respect for the law is concerned. One of those fined was a caterer at an exclusive club in San Francisco, and it is difficult to believe that those who ate the illegal ducks with relish did not know they were doing so, thus compounding a felony for which they were not fined. However, the epicures may have consciences.

ACCORDING to studies made at the University of Rhode Island's Narragansett Marine Laboratory, the undersea world is a rather noisy place, certainly not as silent as one might think. Of sixty North Atlantic coastal fishes studied, only six produced no sounds at all. Some sounds were found to be made with a purpose, as an expression of fright, for defensive or offensive purposes, as a means of communication—particularly during breeding—, as a response to change in surroundings. Or there may have been no purpose other than to make a noise. Twenty-seven of the fishes produced sounds by means of an air bladder, or by friction of one part of the body against another like a grasshopper. Some may grit their teeth. A striped bass gives a single, deep-pitched thump; a seahorse produces a loud click like one snapping finger against thumb; a common eel is capable of a dull thud or thump and a low clucking sound. A hydrophone and a sound recorder were used to check up on the fishes, and they were subjected to carefully controlled situations and stimulation. These studies have been reported in a bulletin of the Bingham Oceanographic Collection of the Peabody Museum of Natural History of Yale University. The studies were made and the bulletin written by Mrs. Marie Poland Fish. R.W.W.



## The Teeter Bird

By THEO. H. SCHEFFER

By mossy fringe-drip the ouzel stands  
and teeters  
and totters

At cool marge of the waters.

"Why," asks the savant," does the teeter  
bird totter  
by wildwood water?"

Unanswered query—except that he oughter.

PHOTOGRAPH BY H. H. SHELDON

# Nearest Thing to A Mermaid

By JAMES E. LAWRENCE

**T**HERE they are," cried the ranger as he cut the craft's engine.

The sky darkened and our small boat slipped into a murky lagoon, fringed by the forbidding mangrove wilderness that is part of the vast labyrinth of waterways that form the Everglades National Park at Florida's southern tip.

"Wh . . . where?" asked my wife, hesitantly.

The ranger pointed to the water.

"I can't see a thing," I shrugged. And then I realized that the ever-present bird chatter had stopped. Even the busy, darting insects were still.

We looked hard into the liquid darkness, being interrupted suddenly when the ranger shouted, "Hold on!" Then with a quick flip of the starter, he let the engine kick in again. Our boat had edged dangerously close to a mat of roots and vines. Like the action of a catalyst, the engine's roar set off a great commotion, and the tiny lagoon boiled. "There they are; over there," directed the ranger.

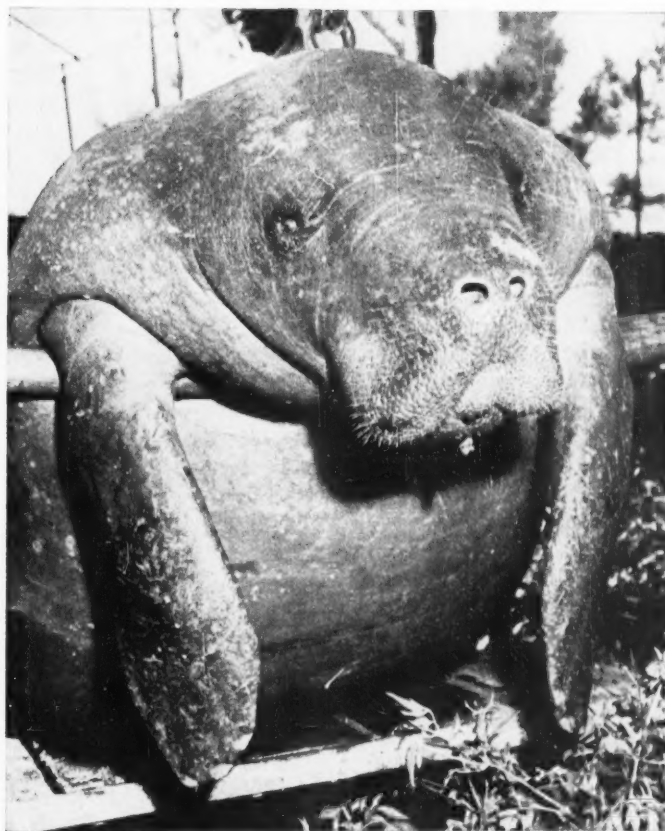
To our right we saw four separate upheavals of mud and water, resembling the bubbling of giant underwater springs. In amazement we watched the up-boilings slither in a zigzag line across the lagoon and disappear out the entrance.

"What was that?" I asked.

"Some folks call 'em mermaids," answered the ranger, as he headed us back to the mainland. "But they're really not," he smiled, shouting over the engine.

Then we knew what he meant, because for centuries the log books of seafaring men have been full of tales of the sea cow, or manatee. The earliest accounts said they were always sighted at a distance, never close enough for careful inspection. So they called them mermaids.

But what strange mermaids were these? Christopher Columbus had no taste for them. On his way to Rio del Oro, he reported seeing three such creatures and noted they were all unlady-like. He claimed they



MIAMI DAILY NEWS PHOTOGRAPH BY BOB GLANDER

**The manatee falls far short of the artists' conception of a mermaid, but the sea cow was so called by early explorers who saw these aquatic animals, but not close enough for a good look.**

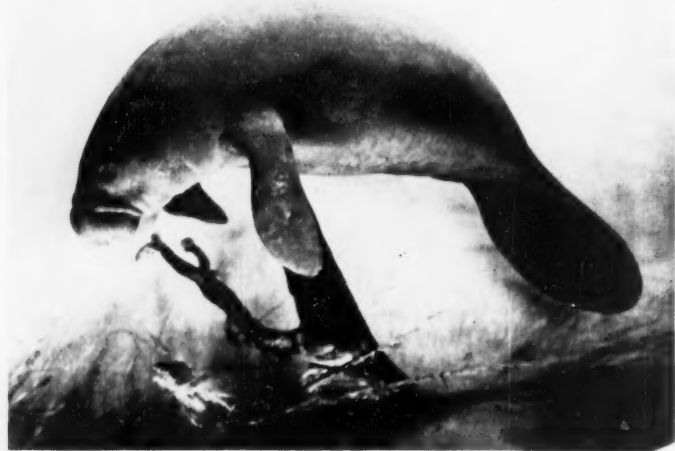
rose high out of the sea and were ugly, that their faces resembled a man's. One of his sailors saw a "mermaid" try to hide its face, and then it blew its nose. Another sailor swore the creatures were bald and had whiskers.

Eventually one of the animals was shot, or captured, or found dead. In any event, scientists got a close look at one. But what they saw was difficult to describe, hard to place in the animal kingdom, and more difficult to name. To Florida Indians this creature was known as a manatee, which is what it is known as today.

Although far from what might be considered comely, the manatee is still the nearest thing Nature can offer in the way of a mermaid. True, the animal is not pretty. In fact, to put it rather bluntly, the manatee is homely, wrinkled, fat, slow, and lazy; hardly the mermaid of imaginative artists. Yet some of its traits are lovable, for it is a completely amiable aquatic mammal. It is an easy-going, harmless vegetarian belonging among the species of American wildlife that conservationists have just recently pulled back from the brink of extinction.

Yet there was much to puzzle scientists when this

creature was first discovered, some claiming it should have been extinct long ago, others saying it was a missing link of some kind. The animal combines the characters of a fish, seal, elephant, walrus, and a small whale, and it has an almost human-like face. There are three main species of manatees—the South American, *Trichechus inunguis*; the West African, *T. senegalensis*; the West Indian, *T. manatus manatus*, with the Florida manatee, *T. manatus latirostris*, regarded as a race of the West Indian. Florida manatees are distributed in the bays, rivers, and lagoons of the Florida coastline from St. Augustine to the Wacissa River, to the West Indies and the Amazon River, and across to the west coast of Africa. They range in size from nine to fifteen feet long and weigh from six hun-



COURTESY AMERICAN MUSEUM OF NATURAL HISTORY

This is the manatee in the Manatee Group in the Hall of Ocean Life at the American Museum of Natural History in New York. The animal's habitat and habits do not lend much aid to the photographer of the creature in the wild.

dred pounds to a ton, making them "hefty mermaids."

Except for a small, grotesque head: foot-long, fingerless flipper arms, and a horizontal, gracefully broadened, fluke-like tail, the manatee's thick, rounded grayish-brown body is practically shapeless. It is simply a neckless, round-shouldered glob of usually tranquil animal matter. The few persons who have seen the secretive, shy manatee in the wild have usually observed it lolling lazily in a bay or lagoon with its back excessively curved and its tail tip touching bottom. Five to ten times each hour massive shoulders part the still water as explosive snorts sound through the quiet air. The manatee breathes a couple of times, relaxes, and slowly sinks out of sight. Frequently these bulky bobbing animals are mistaken for half-submerged logs by the daring speed-boaters who weave in and out of Florida lagoons.

Because manatees often travel together in families

that periodically herd into groups of thirty or more animals, which graze on underwater grass pastures, they are commonly known as sea cows. But despite these qualifying habits, some naturalists believe the manatee's melancholy face contributes most to this bovine association.

A manatee's face lacks all the appeal one might expect to see in a mermaid. Head on, the creature is easily mistaken for one of James Thurber's famous mournful dogs, the epitome of continual sadness. The broad muzzle terminates in a greatly swollen upper lip, divided rabbit-fashion into two lobes. The nostrils above these lobes, located at the muzzle's tip, are two valve-like slits equipped with trigger-quick flaps that seal out water when the animal submerges. The slits are so conveniently located as to permit the mermaid, should it desire, to breathe at the water's surface without ever showing its face.

Further limitations to beauty are the numerous stiff, pig-like bristles—food gathering aids—which cover the flabby lips and cheeks with undeniable proof that the siren is whiskered. Further, the head is bald, the eyes are tiny, inconspicuous balls sunken into and practically disguised by many wrinkles, and there are no ears. As for the rest of the animal, over its entire body is an inch-thick, tough, finely-wrinkled hide, all but naked except for sparse clumps of delicate hairs.

While all these graceless features might easily discourage mermaidish thoughts, they are essentials every manatee finds necessary for life as an aquatic mammal. But although these features apparently charm other manatees, some observers suspect that these creatures possibly repulse their own kind. To a degree, this may even account for the world's small manatee supply. Perhaps the animal's lack of ears and its small, cloudy eyes are Nature's ways of keeping the manatee in the dark about the true facts of its life. Even scientists are perplexed about what goes on at those soundless, sightless depths in the backwaters and bays of Florida.

Much of the scanty information known about the manatee's personal life has been gleaned through a few observations of tank-dwelling captives, and through fragmentary reports by fishermen, keen-eyed yachting parties, and interested naturalists. Unfortunately authentic records are often difficult to obtain. In many instances the porpoises and sea skates, which frequent the same waters and resemble manatees under some conditions, are mistaken for these "mermaids." However, with the recent establishment of the million and one-quarter acre Everglades National Park at Florida's tip and in the heart of the country's manatee range, periodic reliable checks are being made on the animal's doings by



Federal wardens and biologists in an attempt to unravel some of its secrets.

While naturalists have not as yet studied thoroughly all aspects of the manatee's family life, it is believed that some type of social order may exist among these animals. Typical families are reported to consist of a bull, a cow, and one or two youngsters. Families band together from time to time to form loose herds of a dozen animals, which dwell in lagoons or along slow-moving rivers where food is plentiful. Night boaters passing a herd of grazing sea cows are frequently shocked by the overtones the manatees produce. The smacking of lips and the crunching of teeth may be heard for a couple of hundred yards when the air is still. They are often much noisier than a herd of feeding horses.

Other noisy outbursts occur when manatees play their kissing game. It is not certain whether the basis for this frolic is horse play, friendship renewal, or the mating urge, but it has been recorded at all times of the year. The game begins when a pair of manatees suddenly appear high out of the water and smack their muzzles together in a lip sizzler that echoes across the water like a small clap of thunder. Disappearing for a few moments, the pair turn up again a short distance away and send another kiss echoing through the air. This continues until the animals tire.

During the fall months, mature male manatees slip away from their herds to visit neighboring bands and seek their fortunes. Periodically an especially vibrant bull proclaims his greatness by terrific snorts that carry for long distances and sound like the deflating of a gas balloon. Occasionally two roving males meet, inadvertently. They flex their muscles, give a poor imitation of shadow boxing, and then meekly decide that they are not quite sure about what they were trying to prove in the first place.

Because of this meekness, as well as a placid manner, an expressionless face, and an apparently simple existence, the manatee's intelligence may well be seriously questioned. Offhand, it would be an easy matter, on the basis of this evidence, to rate the manatee stupid and uninteresting, especially since much of the animal's actions are shrouded in mystery. But judging from the acclaims of aquaria keepers who have witnessed the sea cow's antics under glass, the manatee may often show great versatility in experienced hands.

A manatee in the Miami Aquarium learned to come when called by name, roll like a ball, or perform its version of a hand stand when its handler commanded and provided the reward was a lettuce leaf. Another,

a resident of the South Florida Museum at Bradenton, did all these things with equal ease, in addition to rubbing noses with its keeper. Moreover, it clinched the act with a vigorous flipper-hand shake.

Cold weather is one of the manatee's major enemies. Despite their blubbersome hides, many of these creatures perish as a result of those freak Florida freezes. Although chilly waters and low temperatures are somewhat bothersome to the manatee, it is actually the prolonged contact of cold air with the animal's lungs that causes death.

Still, some manatees living in northern Florida streams will often gamble with death rather than make the usual southward migration to warmer areas. Relying on its lazy instincts and opportunist inclinations, the animal has been known to loll winter away as far



This photograph of a tethered manatee indicates its profile and shows its tough hide, which was once sought for leather.

north as Jacksonville in the large, warm springs that are part of the northern network of rivers and streams. Favorite hangouts are Blue Springs on the St. Johns River, Manatee Spring on the Suwannee, and Big Spring on the Wacissa. Residents of Orange City near Blue Springs report that manatees in the area have an uncanny ability to predict cold snaps. When the animals arrive at the springs and hover motionless at the bottom despite existing high temperatures, a temperature drop invariably follows a couple of days later. Fortunately these large northern springs usually supply warm water fast enough to keep the cold air above them from reaching the lethal point.

When it comes to food, preferred manatee dishes are manatee grass, turtle grass, eel grass, pondweeds, and many of the other tropical and semi-tropical hard-to-chew, difficult-to-digest underwater plants that only this creature could possibly relish. In captivity, manatees have put on poundage on diets of cabbage, spinach, kale, celery, lettuce, endive, turnips, carrots, clover, and alfalfa. Moreover, the animal's fifty to eighty pound daily intake of fresh greens may often also include baked apples, orange peels, grapefruit, and bread. In short, a pet "mermaid" can be an expensive item.

The Florida manatee was once considered a highly prized resource. A number of accounts indicate that it was early sought for its ivory-like bones and rich

meat supply. Records of the Timucuan and Seminole Indians tell of manatee hunts that refer to the animal as "big beavers." The Spanish explorers and settlers, and the wandering bands of pirates that frequently operated along the Florida peninsula, also found the manatee an important resource. They used the animal's lard coating in cooking, and rendered it into oils and greases for shipping needs. They also smoked and dried the meat, or salted it as a substitute for the omnipresent salt pork.

In recent years, before restrictions were imposed, manatee hides were used for leather in special cases where an extra-strong material was required, such as the packing around pump valves. Ten pound pieces of manatee flesh were also once common in certain Florida markets, peddled as salted fish. Even more recently, strips of cured skin were twisted into canes and considered fashionable.

Early tourists in Florida found manatee-killing great sport. Pot shots at bobbing sea cow heads by shark-hunting yachting parties resulted in the same type of decline in manatee numbers, by the turn of the present century, as was experienced with the bison. Moreover, the relentless search by market hunters for manatee meats and hides raised the death toll even more.

In fact, in the case of the market hunter, it was solely a matter of outright slaughter. Not satisfied with harvesting merely the adults, some hunters made a special practice of killing baby manatees for their choicer meats. This soon resulted in a depleted resource, and almost annihilated the breeding stock. Reminiscent of these doings is Cowpens Key, so named because sea cows were once herded into a cove there and penned up like livestock for slaughter. During those heydays, manatee steaks often undersold choice beef, although many a back-country cracker claims a sea cow is "better 'n beef any day."

These days manatee steaks come high. The Florida Legislature saw to that when it established a fine of \$500, a few years back, to save the animal in its eleventh hour and discourage illegal traffic. The manatee has since responded reasonably well under this protection, but its comeback is slow and poaching is still a problem.

Residents of Manatee County, named for the animal, found manatees scarce when they combed their countryside for a genuine "mermaid" to highlight an important fiesta, and were unable to locate a single one. Embarrassed fiesta officials were forced to call on Miami for help. When word of this leaked out, Miamians decided they wanted no part of any scheme to cart one of their manatees across the State to share honors with a bunch of bathing beauties.

It is true, however, that Miami does have its share of manatees. It has, in fact, a rather sizable population, a curious circumstance in view of the animal's

known desires to shun all forms of human activity. The sea cows that live around Biscayne Bay often journey to the heart of the city via the Miami River and its many interconnecting canals. A short time ago four manatees caused a stir when they were unavoidably trapped ten miles inland in Twin Lakes at Miami Springs by the closure of the Miami River outlet. A few months later two more caused another sensation when they were hoisted over a dam on the Little River Canal after they lingered around the structure for days craving attention.

Biologist Joseph C. Moore, Everglades National Park's manatee expert, believes the animals congregate around Miami for the sole purpose of protection. Here they appear to be safe from destruction by vandals and illegal meat hunters. In addition, Moore notes that Miami manatees have figured a way to beat the city's occasional winter cold spells. On cold winter days he has stood on the Miami Avenue Bridge and frequently counted as many as ten bobbing heads gathered about the water-waste outlet of a nearby factory. The warm water that pours into the river is at the right temperature to take the chill off the surrounding air.

Although Miami has its share of manatees, the country's biggest mermaid population is concentrated around Florida's tip, with its abundant bays and lagoons set against a forbidding mangrove backdrop. The Everglades National Park embraces practically all of this never-never land. Countrywide, conservationists gave a sigh of relief when the Park was created a few years ago, for at long last the shy, placid-mannered sea cow could come home to rest and replenish its herds.

One of the first actions of the National Park Service after the establishment of Everglades National Park was to initiate an investigation of the manatee's status. It was through the Service's wisdom that biologist Moore was able to develop the beginnings of a management plan for the manatee. Moore now feels certain that the sea cow has a guaranteed future. He believes that the wide and ever-increasing influence of organizations and individuals interested in conserving natural resources in general, and rare species like the manatee in particular, is one guarantee. Also the Park ranger patrols throughout the Everglades offer the animal complete protection in an area of its own choosing, an area that is large enough to support a good number of herds.

However, no one will deny that in the final analysis, manatee increases will depend on the animal's own abilities. This breather may be all the creature needs to get itself out of the twilight zone. And in view of its proved ability to adapt itself to a situation, nothing should deter the easy-going, yet forceful manatee, our nearest link to a "mermaid."

# World of the Water- Way

By VIRGINIA S.  
EIFERT

*Photographs by the Author*

Cypress shores along the Intracoastal Waterway of southwestern Louisiana, as seen from the towboat on which the author traveled.



ON EASTER Eve, a 2860-horsepower diesel towboat, 113 feet long and 45 feet wide, bearing a crew of fourteen men and two lady passengers, was moving at an even rate of six miles an hour through the Intracoastal Waterway of southwestern Louisiana. The towboat was shoving two huge steel barges totalling 550 feet in length and containing an aggregate of 40,000 barrels of high-test gasoline. And ahead of the barges, far across the great level coastal marshes, half the sky was lit with a lurid red cloud of smoke mushrooming from a tremendous fire whose flames were devouring in great gulps acres of dried roseaux cane. On the opposite side of the burning world, a big golden moon ballooned placidly out of the marshes; oil rigs were lit up in gaunt silhouette. Easter Eve! Surely I have never known a more curious one.

Six days before, on a bright, exciting, cool April day, when only the beginnings of spring were visible in tiny new leaves on the trees and daffodils in our gardens, my companion and I, setting out on our most exciting adventure, had left St. Louis aboard the towboat *St. Louis Zephyr*. Day after day, as we traveled down the Mississippi's endless curves, we watched spring advancing, mile after mile, until, in southwestern Louisiana a few days later, it was high summer.

Great blue herons fished at intervals all along the twisting, massive, amazing river—on sandbars, among

pile dikes, on revetments, under caving banks, on levees and snags. It was a river of herons—greens and great blues, night herons at dawn, American egrets and curly-plumed snowies. The latter grew more and more abundant with every mile as we approached the sugar coast and New Orleans.

Certain gaunt black creatures sat on snags all along the river from St. Louis to New Orleans.

"Black loons," said the pilot.

"No, you're wrong there," disagreed the mate. "They're water turkeys."

"Cormorants," said we, stubbornly, with the bird guides to back us up.

At 6:30 one morning the captain steered the tow in as close as possible to a sandbar so we could see two magnificent flocks of white pelicans resting on their northward flight. Bald eagles ate dead fish on other sandbars.

With three of our five empty gasoline barges moored in the Mississippi near New Orleans, we entered the Harvey Locks, front door to the strange world of the Intracoastal Waterway, which we were to follow 255 miles southwest to Lake Charles, Louisiana. The sole purpose of the *St. Louis Zephyr*'s 2600-mile trip, of course, was to fill barges with some three million gallons of gasoline, but an incidental purpose was added when we joined the cruise to discover the wild-



Only a narrow rim of roseaux cane separated the boat from the Gulf of Mexico. An oil rig rises from the waters of West Cote Blanch Bay.

life of the Waterway as it would be revealed from a moving towboat. In no other way, perhaps, could some of it be seen.

The bridge and the pilot house of a towboat are one of the little-known, perfect spots for observing birds. Riding high above the water level, one may see far out over the expanse of a marsh, while the boat moves slowly enough to permit leisurely observation. Of course, there is a further advantage when one has a captain and a pilot who will obligingly steer the tow in as close as possible, so one may see things better, and a crew constantly alert to show us things. There is a drawback, however. A towboat may move slowly, but it does not stop and it does not go back, nor does it permit one to get off and plunge into a marsh in pursuit of birds too far away to be seen well. But with these handicaps admitted, a towboat is still a remarkable spot from which to watch birds and other wildlife as they exist far from trails and highways.

The Intracoastal Waterway is 125 feet wide and 12 feet deep. There is much boat-freight moving through it, so that when two tows, each fifty feet wide, must pass in the surging beds of water hyacinths, with the bony knees of the tall cypresses on each shore actually making no real shore at all, both boats must shove in quite close to the sides. It was at times like these that we could look down into the cypresses and willows, into the new leaves of the red bays and the water oaks, down into festoons of silver moss where parula warblers buzzed, and upon the masses of new growth of trumpet vines and cross-vines, upon the great pristine snowflakes of the spider lilies and the sparkling blue blossoms of certain incredible Louisiana irises. Prothonotary warblers, Louisiana water thrushes, many unseen

warblers, and orchard orioles sang in an endless procession of music and motion in the sunshine as we chugged past. Occasionally in a dead cypress top there sat a group of black vultures airing the dampness out of their wings.

The Waterway was never long the same; mile by mile it was ever-changing. From deep, wild cypress swamps we moved out into the more civilized Cajun country, then into broad, level, muskrat marshes that spread to the horizon. These marshes were alive with redwings and kingbirds, marsh wrens and tree swallows. In the acres of roseaux cane, the plumes of its old growth bent in one direction and the new growth pushing up below, the male boat-tailed grackles, in the ecstasy of April, gurgled, squeaked and spread their glistening tails. Meanwhile, the sleek brown females, surely the prettiest of all blackbird females, sat about with their beaks in the air, palpably ignoring the glorious performances of the males.

As we moved along at six miles an hour, our empty barges riding high and bucking the wind, we watched from the pilot house, or ran from bridge to bridge to watch one shore or the other. Now it was an eagle coasting low over a marsh; or, on the other side, half a hundred snowy egrets in their breeding plumage. We would dash back again to the port side when a flock of keen-winged black skimmers got up from the shores of Hackberry Lake and flew over the *St. Louis Zephyr* trailed by three fish crews; or strain to see shorebirds that were too, too far away in marsh pools dazzling in sunlight. We hoped for alligators, but, the rivermen told us, there is too much traffic on the Waterway nowadays, and the alligators wisely have moved back a little way into the swamps.



**Cajun houses and moss-hung oaks along the Intracoastal Waterway near Morgan City, Louisiana.**

At night when the moon was a great light over the marshes and the Waterway, illuminating our barges and accenting the sheer banks of the rice fields, we watched for night creatures. Crew and captain watched, too, and without a doubt we had the most Nature-minded and interested towboat crew ever to travel the Intracoastal Waterway to get a load of gasoline for the motorcars of the middle-West! The captain turned the arc lights on the shores, and in this clear-cut illumination everything stood out sharply. We saw muskrats at the edges of rice fields; saw three fine skunks, their startled tails in air; saw two opossums and a raccoon; saw five cottontails and a weasel.

Next day, as we passed through an arm of the Gulf of Mexico, our wake boiled with salt-water foam. In the salt marshes, down into which we looked from our perch on the bridge, hundreds of black-necked stilts were yipping and flying about with their scarlet legs dangling. There were dowitchers and sanderlings; hordes of miscellaneous sandpipers; royal terns and laughing gulls; and brown pelicans fishing in Calcasieu Bay. And ahead of us lay our destination, the oil docks of Lake Charles, Louisiana, thirteen hundred miles from St. Louis.

Five hours later, our barges filled, we headed back the way we came. That night—Easter Eve—we pointed our 40,000 barrels of high explosive toward



the great conflagration in the marshes. It was a night in which the arc lights turned up only rabbits and some snowy egrets that flew up, angel-like, out of the willows. The following night we passed through the shadowy fastnesses of Bayou Boeuf, land of the big cypresses, where our wake sucked the water out of the shallows so that silvery fish went flipping about, while raccoons, opportunists all, hunched among cypress knees, expertly caught them.

Late that night trouble was brewing on the bayou. An insidious white misting was in the air, a breath exaggerated in the white beam of the arc light cutting through it. Fog! No, not fog yet, but after midnight it closed down with a white finality that meant maneuvering the clumsy tow toward shore so that deckhands could get a line around a tree. Tethered to shore after an hour of hard work in the blinding murk, the motors were quiet and we slept.

But not for long. At 4:50 a.m. an ear-splitting chorus of Louisiana birds burst forth to greet the sun. White-eyed vireos were positively explosive; towhees and cardinals, Carolina wrens and Carolina chickadees, yellow-breasted chats and tufted titmice, prothonotary warblers and orchard orioles, normally all loud-voiced anyway, sang at the very



**The *St. Louis Zephyr* tied up at the oil docks at Lake Charles, Louisiana.**

Three of the five empty barges were moored in the Mississippi near New Orleans before the tow entered the Harvey Locks and the Waterway.

tops of their voices into the windows of the boat. Perhaps it was the complete quiet of the fog-bound Waterway, the unutterable peace of the far, lone reaches of wilderness and water that surrounded us; at any rate, the birds on this fringe of shore willows were surely the loudest I have ever heard on any day in spring. And I have listened to many a dawn chorus.

Sun burned off the fog and we were on our way. Again we entered the big cypress swamps near Barataria Bayou, where a sudden mishap that afternoon fouled a rudder and a propellor in driftwood, and the engines stopped. We could scarcely have chosen a more splendid spot in which to get into trouble!

A gaudy southern pileated woodpecker flashed from the cypresses and crossed the Waterway. A green lizard slid over a palmetto leaf. Louisiana herons streamed to the distant marshes. Egrets winged their way to nesting grounds somewhere in the direction of Avery Island. A half-dozen wood ibises beat slowly across the great swamp. The splendid April wildlife of Louisiana surged and sang and flew all around us.

Finally we came out at last into the splendid depth and width of the great old Mississippi. Then we knew that our sturdy boat had deep water under her at last, and had enough room to navigate without fear of snags. We felt that surely we had seen all the things we were going to see; that the homeward trip, after filling three more barges with gasoline, would be simply a repetition



of all we had seen before. But we still had one of our final delights.

Against a sky piled with massive clouds, sixteen anhingas, or snakebirds, on set wings, circled in rhythmic patterns above the *St. Louis Zephyr*. Around, around they circled, scarcely moving their wings yet imperceptibly changing formation, long necks and long tails outstretched. We watched as our slowly moving boat inexorably carried us northward from the strange world of the Waterway and the land of soaring snakebirds and their neighbors of the southern swamps.

## Jugs of the Potter Wasp

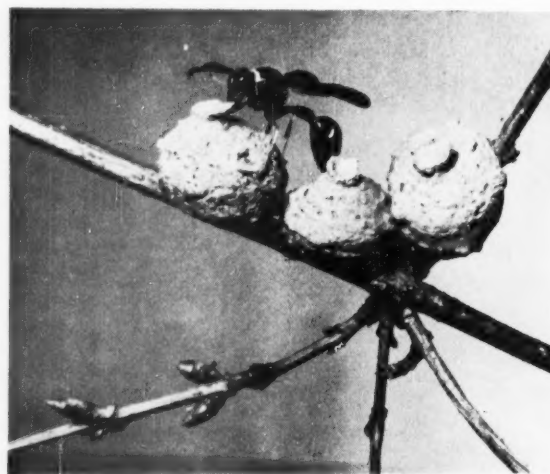
By GEORGE A. SMITH

*Photograph by the Author*

**D**own through the ages insects have developed many odd and various ways of providing for the safety and well-being of their young. One of the most remarkable insects in this respect is the potter wasp, which builds curious little jug-shaped nests out of pellets of mud.

These little brown jugs are usually found on low-growing shrubbery and grass stalks. Each nest is individually constructed from hundreds of tiny balls of mud, which the female wasp carries from some suitable mud bank near the site of the construction. In fact, this wasp is her own hod carrier, brick-layer and master architect.

After a jug is constructed, the mother wasp places in the receptacle a generous supply of preserved food. This is in the form of small spiders that have been paralyzed by the parent wasp, who stings her captives in vital nerve centers so that they will remain alive but helpless until they are to serve as food for the baby wasp. A single egg is then laid on top of the pile of spiders. Finally the female wasp seals up the jug and



leaves the scene without showing any further concern for the well-being of her offspring.

When the infant wasp hatches from the egg it finds its nursery well stocked with a supply of preserved spiders. The young wasp lives on this food until it is ready to enter the pupa stage. Inside its nursery it then changes into an adult wasp and finally emerges by chewing a hole through the side of the jug.

# Empusa, Fly-Killing Fungus

By LESTER E. HARRIS, JR.

Drawings by Uriel



Housefly caught by the fly-killing fungus called *Empusa*. The fly, enlarged, is surrounded by a halo of discharged conidia.

A HOUSEFLY stuck fast to the window-pane is a sure sign that *Empusa*, the fly-killing fungus, has been at work. Perhaps you have noticed a housefly feebly fanning its wings in an attempt to come unstuck from a window-pane or mirror. If you looked closely enough you also noticed a peculiar smoky halo surrounding the fly's body. The housefly has fallen prey to Nature's version of sticky fly-paper. This method of controlling the housefly pest long antedates the efforts of man toward the same end. The fly has been infected with a minute fungus called *Empusa*, the scientific name coming from Greek mythology, in which it is the name of a mythical being of vampire characteristics. It is one of the many ways Nature has for keeping housefly numbers in check.

For most of us a knowledge of the fungi begins and ends with the flesh-pink, plump mushrooms that add delicious flavor to a steak dinner; or with the greenish-blue, penicillin-type mold that comes on an orange if kept too long; or with the fuzzy, velvet-like, black bread mold that forms on the forgotten slice of bread in the back of the bread box. However, some of the little-known fungi like *Empusa* have such bizarre characteristics that they are most fascinating once their acquaintance has been made.

*Empusa* spends part of its life inside the body of the housefly. Here it develops its own odd-shaped body, which looks most like a number of small, very knobby, potatoes joined together. This bumpy body develops simply by dividing in half to form two fungal bodies, or a bud may form on one of the fungi to form a rapidly developing branch body.

As *Empusa* grows in the housefly, it feeds on the fly's softer tissues until the entire body cavity of the fly is filled with the fungus. Along about this time the fly has ceased to feel its physical best. It is sluggish, and slow to do much flying around. If it flies at all it may bump right into your face, or become tangled in your hair. If favorable conditions of temperature

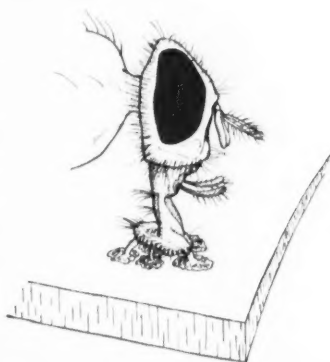
and moisture are present the fly-killing fungus now rushes to the completion of its development.

Probing parts of the body of the fungus will grow out of the mouth of the fly with great rapidity at a moment when the fly is resting. These parts attach themselves by means of a sticky, thick secretion to whatever the fly is on at the time. The housefly is, by this time, too near to whatever "happy-hunting-ground" may be its lot to resist capture by more than a few feeble body jerks and wing buzzes. *Empusa* has caught its fly. Death soon follows.

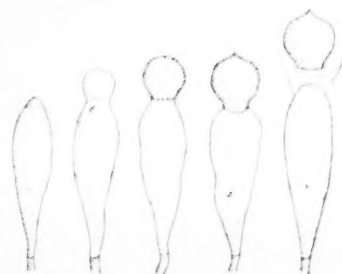
At about the time the fly dies the fungus stops feeding on the tissues of its host. It is time to reproduce. The main body of the fungus sends out probing fingers of jelly-like protoplasm called hyphae. These hyphae burst through the softer parts of the fly's body, usually between the body segments in the rear part of the abdomen. They become thick and club-shaped. Then a globular body develops in the end of each "club." These round bodies are called conidia. They rapidly enlarge until their development is complete. So many of them are formed that the body of the fly appears to be ringed with a number of downy "cushions." These "cushions" are usually of a livid white, but may vary to pale or bright green, or dull olive color.

When a sudden increase in humidity occurs, as just before a storm, the conidia are "shot" out in all directions. Each cannon-ball-like conidium is propelled by the force created when it and the "club" suddenly absorb atmospheric moisture. The conidium increases in size until it ruptures the membrane holding it fast to the tip of the "club," or conidiophore as the "club" is called. The tip of the conidiophore has been depressed by the enlarging conidium. This tip suddenly rounds up when the membrane ruptures, acting on much the same principle as a slingshot to propel the conidium outward.

The conidium, when discharged, might by chance come into contact



Head of housefly with "mouth" held fast to a window pane by probing parts of the fungus. Magnified about 12 times. Below, steps in development and discharge of "ball-shaped" conidia. Magnified about 160 times.

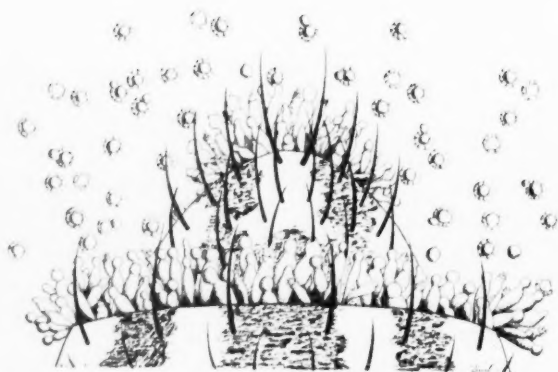


with another fly. If it does, it will stick to the fly and send out a hypha of germination, which enters the fly's body, and the cycle begins again. If the conidium does not fall on a suitable host but lands on the ground, a flower, the wall, or windowpane, it proceeds to form what are called secondary conidia. These are outgrowths of the conidium and are discharged in the same way as the conidium. This process keeps on repeatedly, allowing the fungus, in a sense, to travel around until a host is found, or its own vitality is exhausted. Infection will not result if a fly should accidentally eat some conidia along with its food.

The life history of *Empusa* has been known to botanists for a long time, but has seldom been pictured to the general reader for the interesting plant that it is. It is widespread in habitat, being found over most of North America, South America, and Europe. It occurs in the United States in greatest abundance from the latter part of June to late August, during the hottest part of the year.

Look for the fly-killing fungus; it may be seen stuck fast to the ceiling, wall, or mirror, but it is most often seen attached to a windowpane.

*Empusa* is an example of a simple plant modified



Rear end of the abdomen of a fly, showing close-up of club-shaped conidiophores and discharged conidia. Magnified about 40 times.

and adapted to survive in a most peculiar and interesting fashion. Such modification and adaptations seem to be the rule rather than the exception in Nature. A speaking acquaintanceship with some of these little-known phenomena of Nature will give us a more complete understanding of some of Nature's broader aspects, such as balance and organization.

## Fiddlers

By HUGO H. SCHRODER

*Photograph by the Author*

**F**IDDLER crabs are numerous along both coasts of Florida, coming out of their burrows by the countless thousands at low tide. They are found also as far as Massachusetts to the northward and along the Gulf westward.

Males may be easily distinguished from the females, since the males have one over-sized claw; the females claws are both alike. This gives the females an advantage for they can use both claws while eating. There are three different species of fiddlers, but they all provide food for water birds and bait for fishermen.

The fiddler crab eggs are deposited in the sea, where the tiny crabs undergo a number of changes in form until they leave this birth-place to live on the shore. Fiddler crabs' eyes are on stilts, and can be elevated or lowered as the need arises. Males wave their over-size claws about as they travel on the sands, evidently as a form of greeting to others.





# Better- Bred Trees

By DOROTHY M.  
MARTIN

*U. S. Forest Service Photographs*

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Part of the nursery of the Institute of Forest Genetics at Placerville, California. Here new pine hybrids are given their first nursery tests.

**T**REES are not perfect. Looking at them with a cool, commercial eye, scientists find them easy prey to weevils, beetles, budworms and borers. The lofty pine, the sturdy oak, the mighty chestnut, and the other towering monarchs of the forest also catch strange diseases, such as oak wilt, chestnut blight, and pine blister rust. And they grow too slowly. Planted today, those preferred for construction work do not mature for 75-85-90 years.

What this country needs, scientists decided, is fast-growing, insect- and disease-resistant trees. They have not developed perfect ones yet, but they have found a way to make them better, through selection and crossbreeding. The most far-reaching program in this field is carried on at the Institute of Forest Genetics at Placerville, California, where, on 106 acres of land, two Forest Service geneticists are bent on producing better pine trees for America.

The pine-breeding program started some 25 years ago, when geneticists successfully crossed the rapid-growing Monterey pine with the cold-resistant knobcone. Although crossbreeding of trees has progressed steadily, today it has reached only the same stage of development hybrid corn attained in the 1930's. Principles are understood, but large scale application of them is only starting. The outlook for trees, however, is just as bright as the accomplishments with hybrid corn.

Already pine trees have shed some of the frailties of their forest-bred contemporaries. The hybrid between the poorly formed but disease-resistant Himalayan white pine and the American eastern white pine, for instance, successfully shrugs off blister rust. The backcross of the Jeffrey and Coulter pine—produced by crossing a hybrid with one of its parents—resists a most formidable enemy of baby pines, the reproduction weevil.

At Placerville the men have cut the growing time of trees by as much as one-third or one-half. The offspring of the eastern white pine crossed with its western cousin grows twice as tall as either parent in the first three years. The cross between the Apache pine of southern Arizona and the ponderosa pine, when it reaches the age of four, exceeds the ponderosa in height and has the heaviest stem and most extensive root system of any pine seedling at the Institute. The pine-growing experts predict this will be one of the big lumber-producing trees of the future.

Most hybrid pines take characteristics intermediate between the two parents. Some, however, exhibit what geneticists call "hybrid vigor" and grow as fast or faster than the faster-growing parent. Some hybrids inherit the resistance to disease and insects of the strongest parent, and some take on the wood quality of the best parent. Hybrids, therefore, are particularly valuable for planting in areas where the slower-growing or more poorly formed parent naturally occurs.

If crossbreeding is successful with enough varieties, pine timber stands all over the country can be improved. There are 90 species of pine that grow naturally in all parts of the northern hemisphere—from the Tropics to the Arctic, from sea level to 10,000 feet, from swamp to desert. Because of their widespread growth and the good construction qualities of pine lumber, the Institute went to work breeding pine.

To date the geneticists have limited most of their work to a straight cross of the various pine species. The scientists at Placerville, however, have tried a few complex hybrids involving three or four species. They are looking forward to new combinations that will meet all their requirements. "It won't be this year or next," the tree breeders agree, "but just give us another 15 years."

They envision the day when various crosses will

grow throughout the West, the South, the Lake States and the Northeast, and increase timber resources of this country, thus fulfilling the purpose for which the Institute was founded.

Mr. James G. Eddy, a lumberman, established his Tree Breeding Station at Placerville in 1925 to produce fast-growing trees. He was inspired by the successful crossbreeding of plants, encouraged by Luther Burbank and spurred to action by the need for increasing the timber supply. He devoted much of his time and money to his dream, getting financial aid also from the Carnegie Institution and what is now the Soil Conservation Service. In 1953, when he turned his work over to the people of the United States, administration of the Institute was given to the U. S. Forest Service.

Two important steps must be completed before the use of the hybrid pine can become widespread. These are comprehensive testing of the growth rate and survival of seedlings planted under rigorous field conditions and with no nursery pampering, and speeding up the production of hybrid seedlings to provide adequate numbers for testing.

Outplantings in California's Sierra Nevada prove that the hybrids survive transplanting as well as regular pines and continue their rapid growth for at least twelve years. Hybrids have also been planted in test plots in all the important forest regions of this country and New Zealand. Many agencies and individuals are cooperating in testing these trees, but F. I. Richter, in charge of the Institute, says, "It is too soon to know the results of these tests in other regions."

The geneticists have also found ways to speed up the production of hybrid seeds. For controlled tree breeding, the pine breeder climbs the mother tree and covers the conelets with pollen-proof bags to keep off the wind-blown pollen. Then he collects catkins from the father tree, lets them open and shed their pollen in the sterile conditions of the laboratory and then stores the pollen in a refrigerator. When the conelets emerge from their buds, he climbs the mother tree armed with a syringe full of pollen and blows the pollen into each bag.

Seeds from the crossbred cones are planted in the nursery beds alongside the natural offspring of the same parent trees in the Institute's arboretum. The rows are labeled so comparisons can be made.

To get hybrids grown to seed-bearing size in a hurry, the Forest Service geneticists have developed short cuts. They have forced young hybrids to produce catkins and conelets by grafting them to older trees. Through grafting they have brought selected parents together in seed orchards, where they may cross naturally and save the expense of hand pollination. The time from seed to tree has been shortened a year by



At the left is a western white pine and at the right an eastern white pine. The young tree between is a hybrid of the two. These are average seedlings at five years.

cutting the embryo out of a freshly collected seed and growing it in a test tube. Thus from seed collected in September geneticists are able to produce seedlings in December equal to planted stock a year old.

They have developed a seed farm that produces 55,000 sound seed annually. This will reforest 165 acres to hybrid pine at the rate of one hybrid to four trees of ordinary stock. Under the management they recommend, trees are planted close together so they will grow straight and tall with few branches. As they grow, the regular trees are thinned out and hybrids are left as the main and final crop. When seed farms and time-saving methods get into full swing, the pine breeding experts should be able to provide hybrids to rehabilitate broken down forests on a large and economically sound scale.

In other parts of the country geneticists are working on pines, too. The southern pine experts are remodeling their trees to yield more rosin and turpentine. In Texas they are seeking pines that give higher yields of wood pulp than the average, and will use these selected trees to develop new high-yielding strains.

Systematically and without fanfare, Forest Service geneticists are developing better pine trees for America. If the hybrids live up to expectations, the wood industries of the future will be better supplied with raw materials, and forest land owners can realize bigger and more frequent cash crops.

"Trees to order" may become the slogan of the Institute, but there is one thing Mr. Richter and his men refuse to try—a square tree grown to stock dimensions. "And please," he adds, "Don't ask for seeds to plant in the family woodlot. The Institute has no seed for general distribution."

# Gold Specs and Black Sideburns

By GEORGE A. SMITH

*Photographs by the Author*

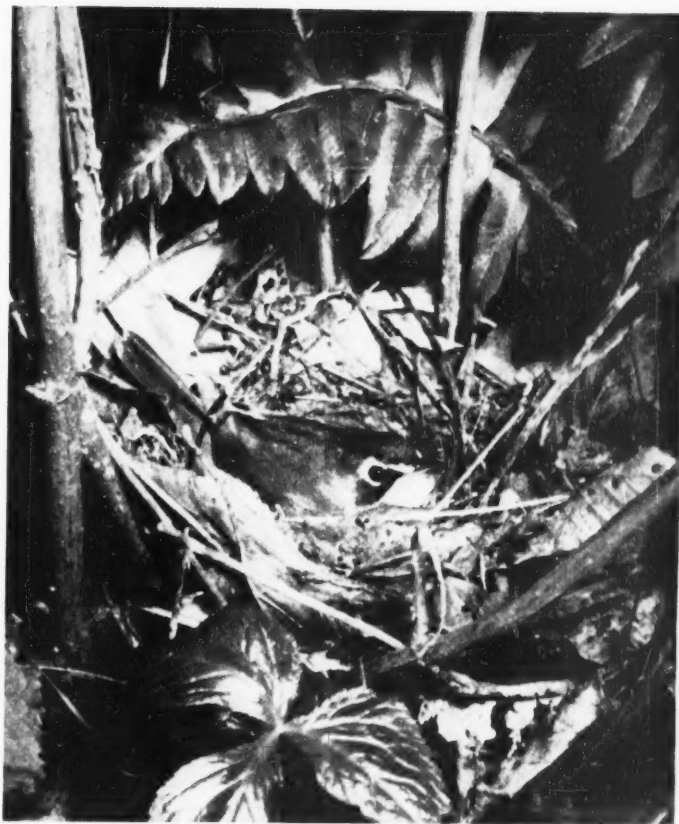
A FLORIDA friend of mine, who has spent many hours afield with the beautiful big birds of his State, planned to take a bird walk with me in my home State of Pennsylvania. Being well acquainted with the wooded hills and sparkling streams of the Susquehanna River watershed, I decided to take my friend on a wood warbler walk in that area. We packed a few sandwiches along with some light camera equipment and were on our way in the direction of the hills of the Susquehanna.

We parked our car in the shade by the side of a main highway and set out on foot along an old trail that led into the woods toward the river. Several ovenbirds and a black and white warbler were the first to attract our attention. Then suddenly the clear sweet *tur-dle, tur-dle* notes of a Kentucky warbler came ringing down through a shaded ravine. Not more than fifty feet from our pathway, one of these warblers was flushed from the ground. My friend was the first to find the nest, which was located at the base of a cluster of bushes growing only a few steps from the edge of a cool mountain stream.

The nest was substantially wrapped with several thicknesses of broad, brown leaves and snugly lined with fine dry rootlets. Lacy, evergreen, mountain ferns, fringing the edge of the nest, completed the setting. The nest contained three grayish-white eggs speckled with a color that looked like burnt umber. Before moving away from the immediate vicinity we set up our camera and made several photoflash shots of the nest. We then found a comfortable spot some distance away and behind the trunk of a large tree, where we settled to observe the pair of warblers.

It took only a glance at one of these warblers to convince my friend that it was a most dignified-looking songster. Both male and female wore gold-rimmed spectacles and long black sideburns. In addition to their striking facial markings, these wood warblers have beautiful olive-green feathers on the upper part of the body and rich yellow ones on the under side. The song of the male, often heard all day long during the nesting season, is a loud, clear, whistled series of two notes that sound like *tur-dle, tur-dle, tur-dle*.

After spending a number of hours in the sacred pre-



Female Kentucky warbler, *Oporornis formosus*, on her nest. Peterson describes its song as "a rapid, rolling chant *tory-tory-tory-tory* or *churry-churry-churry-churry*." The author renders its somewhat differently. It is a bird of hardwood woodland thickets and glades and specially likes moist spots.

cincts of this pair of warblers of the deep woods, observing their beauty and recording a part of it with our camera, we concluded a day of birding. It was then that my friend from Florida remarked that a pair of Kentucky warblers nesting in the river hills of Pennsylvania was just as exciting as the big birds of his State.

Nest and eggs of the Kentucky warbler. The nest was strongly built and snugly lined, and the eggs were grayish-white and speckled with a color like burnt umber.





With fifty-pound shoes sunk six inches, the nightbirds pounce a mile the canyon. This bed only enough has returned that night from the first day's rest of many days of hard, but it was

AND THERE, one was again a fresh trail to the right side to the southeast from the mine. We tips to the surface of the trail was a stamping mill, and a plunge of new road was seen for a trail and back the river are little better as production is off as long as another mile, we had timber, stones, and boulders.

[illegible]

A T I M E D E  
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are covered with heavy growth of fir and spruce. Some of the cedar trees along the river measure 10 ft around. Great galls, which were probably growing 200 years, I cut a chip from one of them with my ax, and found it rises to the inch, which would have given the tree an age of 200 years. On my return to camp I found a lumber-baker some beautiful white loaves of raised bread from

snow. The snow we did not mind at all, but the air was warm and the snow melted, and the water soaking through our blankets made a rather uncomfortable camp.

J. H. K. FONG AND L. J. F. LIU

It took us half the next day to dig out. In the afternoon we moved a load four miles up the river to a point called by the people below "The Forks." This is the

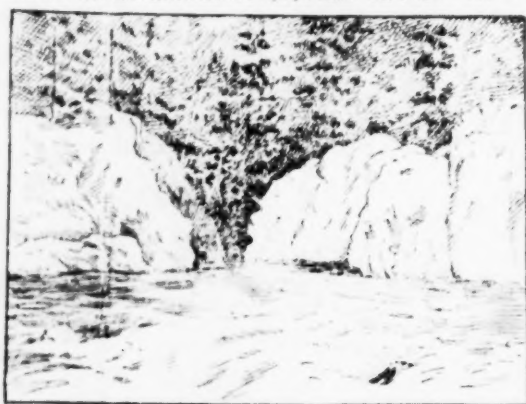
**A DAY AT IT**  
March 1—The day's  
The snow continues  
most impossible to in  
condition.

## COOPER, G. A. ET AL.

Record of Adventure

[illegible]

Just as I got up the caught sight of a lion leaping across the river. The lion was the dog. The



THE GOLDEN GATES

young. We are going back from the red fir trees for cooking. This kind of bark, which is in thickness from two to eight inches (soft) of pink and makes a fire not unlike birchbark (red). It burns freely and with a bright blaze, with much smoke."

The only farm we could find was a little creek that a man would pump over. The country passed over by us this day consisted of an excellent bottom land. This bottom land alternated from one side of the river to the other. Many good claims can

## “The Goblin Gates” Refound

By ROBERT L. WOOD

**D**URING the winter and spring of 1889-90, a party of five men crossed the then mysterious reaches of the Olympic Mountains in the State of Washington. The expedition, commonly known as "The Press Party," had been organized by *The Seattle Press* to explore the area and to remove the veil of secrecy from its cloud-shrouded peaks.

At that time, the Olympic Mountains were almost completely unknown. Early settlers, of course, had skirted the outer ramparts, but the interior, which was even devoid of Indian trails, was a land of mystery. From the ocean, one series of peaks was visible to the sailor, and, from Puget Sound, another chain of summits could be seen. Still other mountains were visible from the Strait of Juan de Fuca, rising abruptly only a few miles from the shores. Early settlers thought that the Olympics consisted of three ranges, grouped in a triangular pattern and enclosing a great central valley. One of the objectives of the Press Party was to find a route into the valley so that it could be opened for settlement.

The five members of the expedition disappeared into the wilderness in December, 1889. Slowly they made their way up the canyons of the Elwha River, hindered by adverse weather and the rugged, unmapped terrain. They penetrated the very heart of the region now contained in the Olympic National Park. They were not again in touch with civilization

until May, 1890, when they emerged on the southern side of the mountains, ragged, half-starved, and having endured great hardships. The absorbing story of their adventures, related in full and taking the entire issue of *The Seattle Press* for July 16, 1890, can not be retold here, for it is a veritable book in itself.

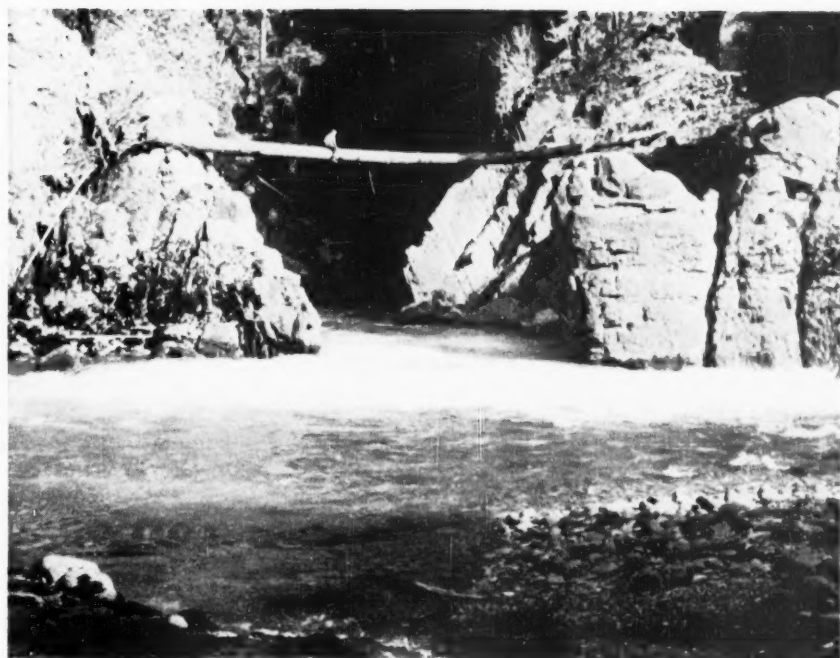
The first "wonder of nature" discovered by the explorers was a deep canyon on the Elwha, the head of which they christened the "Goblin Gates" because of its strange appearance. Later they referred to the entire canyon as Goblin Canyon, but the name did not stick, for today it is called Rica Canyon, and the name Goblin Gates does not appear on any map.

Captain Charles A. Barnes, the historian of the expedition, discovered the Goblin Gates while traveling alone on a reconnaissance mission along the west side of the canyon. The other members of the party had remained behind at their base camp on the Elwha, just below the confluence of the river with Cat and Wolf creeks.

Captain Barnes wrote in his journal:

"A short distance brought me to the end of the canyon. I could see through the trees a lovely valley below. I followed downward a charming little ravine and reached the bottom after a descent of five or six hundred feet. It was at the bottom of the ravine that I caught the first glimpse of Goblin Gates, which must become famous among the natural marvels, not alone

The Goblin Gates as photographed on April 11, 1954, by Frank O. Shaw, who accompanied the author on a trip to rediscover this spot. Jesse Epstein made it a trio. The gates were listed on no maps, and they were unknown to rangers in Olympic National Park, which now protects the mountains and rain forest of the Olympic Peninsula. However, the description of Captain Barnes was so clear that it was possible to retrace his steps and to find the spot visited by him sixty-four years ago.



of the Olympics, but of the whole continent.

"Along one side of a little valley the river thundered in great rapids, with a volume of sound, which, echoed by the bounding mountain walls, became almost stunning. The water of the river suddenly comes to a standstill in a deep, green pool, or basin. On the opposite side of the pool, the mountain is sheer perpendicular rock, smooth and bare. This rock is broken at right angles to the direction of the river, and down this cleft the water of the pool glides as noiselessly as a serpent. It is like the throat of a monster, silently sucking away the water.

"The whole river enters this canyon through portals not more than 12 feet in width.

"These portals are guarded by two gigantic heads of rock. It requires no imagination to see the features in the faces of these two heads, which are 15 feet in height. About 30 feet inside of these heads is another pair of heads, making a kind of inner gateway, with a vestibule between the outer and inner. Upward and backward from the gateway, the canyon walls rise to a height of several hundred feet, making the bottom quite dark. For several hundred feet, as far as can be seen down the canyon, a multitude of faces appear in succession near the water's edge. One could conceive in them tortured expressions, which, with the gloomy and mysterious character of the whole, justified us in giving it afterwards the name of 'The Goblin Gates.'

"The geographical strata here is tilted on edge and consists of alternate layers of hard slate and soft sandstone. The sandstone has worn away, leaving alternating slate projecting into the canyon and forming in profile the heads as they appear from the entrance. The spectacle is one which alone would

well repay a tourist for the trouble of a trip to see."

Checking the account of Barnes' travels from the Press Party's base camp to the Goblin Gates on a topographic map, I saw no reason why I could not find the spot. I suggested to two friends that we make a trip to the place, and received an enthusiastic response.

So we set out, on an April weekend, stopping by the National Park headquarters on the way. The ranger on duty had never heard of the Goblin Gates and could give us no information. So we had nothing to guide us but the account in the Press Report, which proved astonishingly accurate.

Leaving the Hurricane Ridge Road at Whiskey Bend, we proceeded up the Elwha River trail. Far below us, to our right, lay Rica Canyon. From time to time, the sound of roaring water could be heard rising from the forested depths. We took the first side trail leading toward the river. This led to Kraus Bottom. According to the Press Report, the Goblin Gates should be about a mile downstream from this point. As we proceeded downriver, it became necessary, part of the time, to scramble along a steep mountainside, and at one point the route followed a rock ledge above the river. Just beyond was the entrance to Rica Canyon, but from this side of the river it was not possible to see down the canyon.

We followed an old trail that led up the canyon side from Goblin Gates to the Elwha trail. This trail is neither marked nor maintained. Then we proceeded up the Elwha trail to another branch trail that crosses the river by way of a wooden bridge. From this bridge, another trail led downstream along the west bank of the river to the little valley adjoining the Goblin Gates.

From this side of the river we saw the canyon entrance as Captain Barnes saw it when he discovered it, 64 years ago. Such changes as have occurred in subsequent years have been minor, for the appearance of the canyon today is almost exactly as Barnes described it. Apparently the water was at a somewhat lower level on our April visit than when Barnes saw it in March. The waters of the river did not exactly come to a complete standstill in a deep pool, but swirled around, actually flowing in reverse direction to the river, as if confused where to go, before they glided through the cleft in the canyon wall. A piece of driftwood thrown into the pool made several circular trips, tending to return to its starting place, before it finally passed through the portals and proceeded down through the mile of unknown canyon above the head of Lake Mills.

Numerous faces can be seen in the jagged rock walls that line Goblin Canyon. However, while a few of them are obvious, most of them, as with many such

profiles, require a little imagination. As the pattern of sunlight and shadow changes during the day, some faces disappear and new ones appear. Among the numerous figures that can be seen are a drinking buffalo, a rat looking down at the water, a running man, George Washington's face, the head of an ape, an elephant and a dog. High above the canyon an enormous, goblin-like face frowns down upon the whole scene.

We agreed with the early explorers that the spot is an interesting formation of Nature. Where else can one find a swift mountain river that suddenly comes to an abrupt halt, reverses itself to flow backwards for a short distance before proceeding through a narrow cleft cut in a cliff at right angles to the direction of the river's flow?

It was a fascinating experience to retrace at least some of the steps of the pioneer explorers, and to relive in imagination their difficult travels in that then unexplored wilderness now fortunately preserved for posterity.

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## Fungus of the Desert

By NELL MURBARGER

**W**HILE the fleshy types of fungi popularly classified as "mushrooms" and "toadstools" generally are associated with moist woods and meadows, at least one species favors one of the driest regions of the earth. This is referred to as the genus *Podaxis*, whose members lift their shaggy white heads from every desert area between the fortieth parallels of latitude north and south of the equator. This broad belt includes most of the great arid lands of the world.

*Podaxis* flourishes where it is dry and hot, but not too dry. If a season is too dry the fungus fails to put in an appearance, so several years may pass in which the sporophores lie dormant.

Then will come a season bringing four or five inches of rainfall, and, suddenly, the desert seems to have erupted in a white rash of peaked, cottonlike tufts. The plants may be massed so densely that large areas appear as if snow-covered.

Except as to moisture, *Podaxis* is exceptionally tolerant of climatic and topographic conditions. In southern California the genus occurs from below sea-level, at El Centro and Indio, to 5000 feet elevation in the Panamint Mountains, and can endure heat up to 125 degrees Fahrenheit.

The shaggy heads often attain a height up to three inches before breaking through the surface. There-



after they increase in height at the rate of an inch or two daily until maturity is reached. Large specimens may be ten inches tall.

These plants exhibit almost unbelievable force in emerging. Along our desert highways in the Southwest groups of *Podaxis* may "erupt" through a three-inch layer of "black top" paving!

Many specific names formerly were assigned to *Podaxis* as found in various parts of the world. Due to exhaustive research by Elizabeth Eaton Morse, most of the world's leading mycologists now concede that all should be grouped under the single specific name, *Podaxis, pistillaris*, and this interesting fungus may truly be said to be a cosmopolitan among its kind.





# Clouds in the Sky

By CARROLL LANE FENTON and MILDRED ADAMS-FENTON

*Authors of "Our Changing Weather"*

**A**LMOST everyone has looked idly at clouds, seeing in them fanciful ships, castles and even mountains floating across the sky. We also watch clouds as signs of the weather, which may conform to official forecasts or perversely violate them. To the nature photographer, clouds are things of beauty which turn many a view into a picture even as they relate to weather.

Most familiar of clouds are cumulus, the fluffy masses made up of water droplets that float at heights of two thousand feet to a mile. The upper picture shows cumulus clouds above the Green River, in Wyoming; in the one below they drift toward Lassen Peak, in northern California. They also contrast with cirrus wisps, which consist of ice crystals that float at heights as great as seven miles.







On humid days in the early spring, air currents often rise from the ground, producing great turbulence. When they encounter large numbers of cumulus clouds, they produce such forms as these—swiftly moving mammato-cumulus clouds here lighted by the setting sun. Although such clouds are not a sure sign of tornadoes, they often form in the seasons when tornadoes sweep across the middle West.

When air blows over mountains it cools as it rises, often many thousands of feet. Here cooling has produced cumulus clouds which rise so high that their tops are spread out in smooth sheets. Far above them, at heights of four to almost seven miles, cirrocumulus clouds are formed by moisture that freezes into crystals of ice. Such clouds as these often hang above mountains from morning until evening.





Here the sky is clearing after several days of rain. Near the ground are watery layers (strato-cumulus clouds). Higher up, at perhaps ten thousand feet, lenticular clouds are forming and spreading into streamers and sheets. Still higher are icy cirro-cumulus, with their characteristic "mackerel" mottling. Although these clouds are over the St. Lawrence Valley, lenticular clouds are commonest above mountains.

Here a Cheyenne fog has formed as warm, moist air from the Gulf of Mexico encountered the Rocky Mountains. The fog, which is a low cloud, is traveling up broad valleys between ridges and peaks.





Heralds of an approaching storm. Thunderheads, or cumulo-nimbus clouds, are rolling over a desert range in Nevada. Strong winds that blow over these clouds whip moisture from them and carry it to great heights, where it freezes, producing cirrus clouds whose shapes tell of the strong but shifting winds aloft. Within five hours, cold, driving rain will drench the mountains and sage-covered flat.

Here dense wisps and streamers of lenticular cloud are seen against high cumulus (alto-cumulus) and still higher cirrus, which reflect bright sunlight







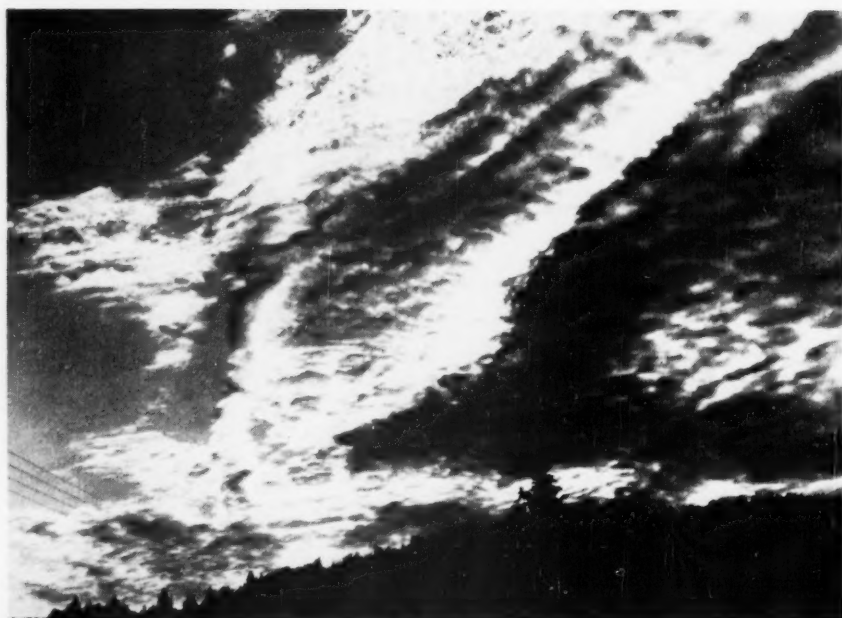
Alto-cumulus clouds are a thicker, lower version of the "mackerel sky." They consist of water droplets that float at heights of about two miles.

Ice crystals that form in great abundance and are caught in rippling air currents make up cirro-cumulus clouds, often called "mackerel skies." They often are so thin that they defy the photographer, but these are unusually thick. They are floating over Lassen Peak at a height of four miles or more, above towering cumulus clouds. The moisture for both has drifted inland from the Pacific Ocean.



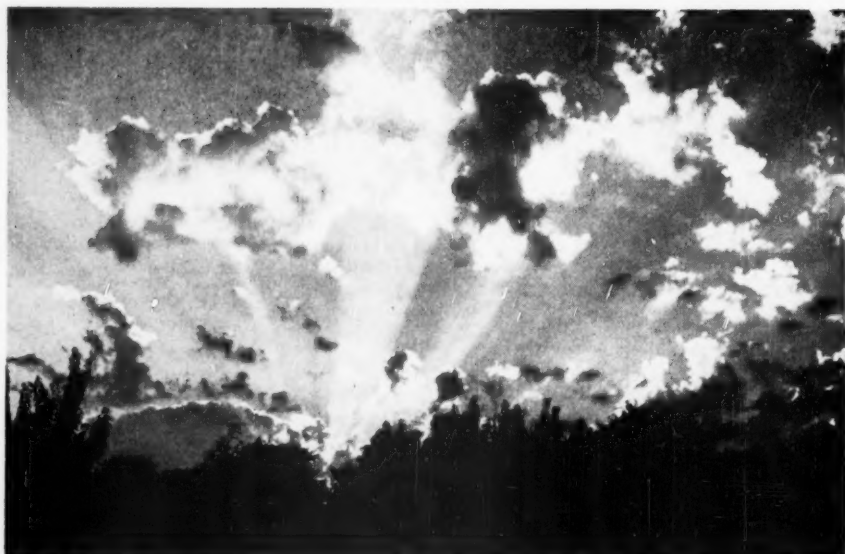


A bank of flaky alto-cumulus clouds at sunset. The definite bands show that these clouds are moving forward with a cold front, where cool air is pushing against air that is relatively damp and warm.



Air blowing over Mount Assiniboine, in the Canadian Rockies, rises and is cooled so much that its moisture forms a banner cloud, which floats to the lee of this glacier-hung peak.

At sunset, cumulus clouds often seem to break into bits and then disappear. Here we see them doing so, while sunlight streaming between the clouds is reflected by dust and droplets of water floating in the air. The result is anticrepuscular rays, which differ only in direction from those that come down from the sky in earlier hours and are often said to show that the sun is "drawing water."



# Helping the Date Palm Make Dates

By DWIGHT WATKINS

*Photographs from Max Kegley and  
U.S. Dept. of Agriculture*

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A garden of date palms in full bearing. The paper guards that have been placed over the bunches of fruit are to protect them from late rains that may cause damage. Here the garden of palms is being irrigated between the rows.

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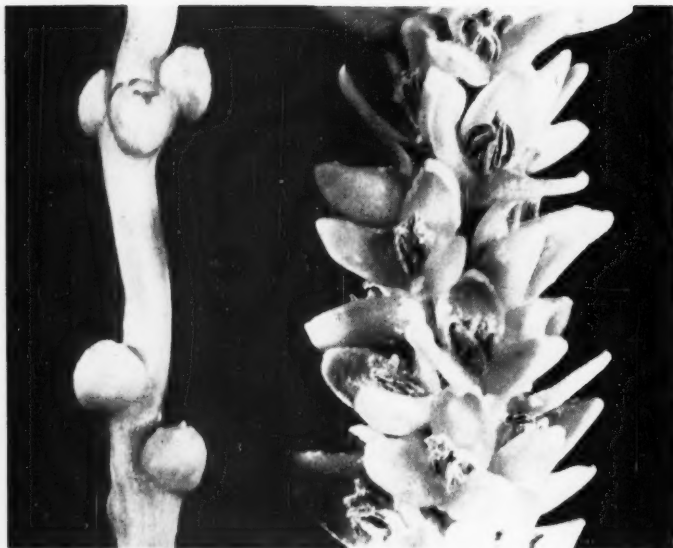
**W**HEN you pick up a package of dates at a roadside stand in Arizona or Southern California, or buy dates elsewhere, you little suspect the interesting and rather complicated story of the date palm tree, and the events that have resulted in the tasty fruit that delights your palate.

Date palms are of two sexes, male and female. There is little difference in the over-all appearance of the trees of the two sexes, but, although both male and female trees bear blossoms, only the female trees bear fruit. For the fruit to form, of course, it is necessary for the female flowers to be pollinated. On each female flower that is to yield a unit of fruit there must fall at least one grain of the dust-like pollen that is produced by the male flowers.

In the original state of Nature, this dust-like pollen was carried to the female flowers by the wind, or, now and then, by insects. Consequently, often only a few of the many, many female flowers were pollinated and the yield of fruit was correspondingly small. Man, however, since he considered dates a delightful and wholesome food, early adopted the practice of breaking off small sprays of the male flowers and carrying them to the female flowers.

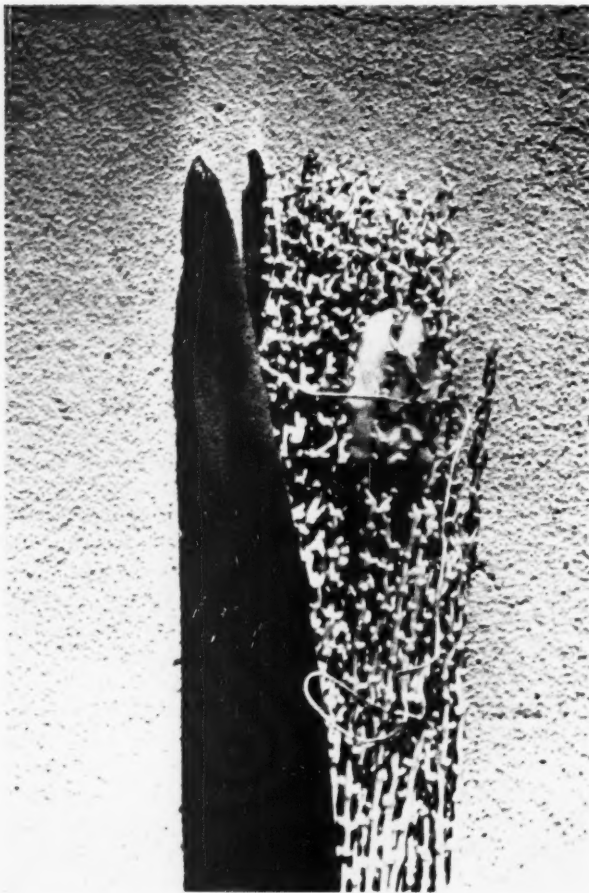
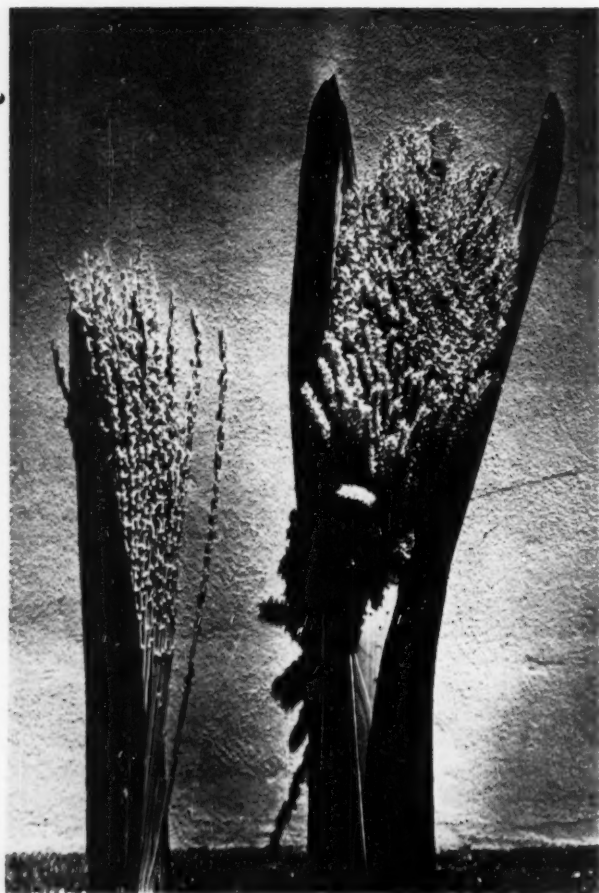
He shook off on these flowers the dust-like pollen, thus pollinating them and assuring a much more abundant crop.

This practice is still continued today, although the spray of male flowers is now usually tied within a cluster of female flowers to insure more thorough pollination. With the male flowers thus secured within the midst of the cluster, the wind continually discharges the pollen upon the female flowers. Sometimes, however, the pollen is dried and rubbed into a small ball of cotton, which is then tied within the cluster of female flowers. This method is followed when the male trees blossom so far in advance of the female trees that the pollen is dissipated before the female blossoms appear. This situation often exists when the grower wishes to pollinate a female tree with the pollen of an earlier-blossoming variety, and thus produce a date having the good qualities of both varieties. In some rare cases the dried pollen is blown into the midst of the cluster with an insect-gun or duster. Thus man assists Nature, and, as a result, some date palms produce as much as three hundred pounds of dates. Without such pollination by human intervention the yield would be much less, perhaps as little as half as much.



At the left, a man is placing strands of the male flower in the center of female cluster. Nearby, tied with a string, is a flower cluster after pollination, and between the two is a freshly opened spathe ready for pollination.

Above, much enlarged, is a female date blossom and male blossoms with the petals heavy with pollen. At least one grain must fall on such bulb-like female flowers. Below, left, spathes of the female and male date blossoms, and, directly below, the cotton ball method of pollination, the ball impregnated with pollen from male flowers.





# Whither National Parks?

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## An Editorial

**W**E HAVE come, in our opinion, to a turning point so far as National Park policy is concerned. To those of us who hold that these areas have been set aside to protect, for a high purpose and for posterity, outstanding bits of our great country, this is a critical situation. For those of us who have fought through the years to preserve the integrity of the National Park System it is difficult to realize that there is a substantial body of seemingly intelligent opinion that cannot understand that high purpose.

We have just been through a thus far successful fight to prevent the serious precedent that would be established by the erection of a great dam in Dinosaur National Monument. One of our opponents in that fight has been the administration of the Department of the Interior itself, which has sold its own National Park Service "down the river" in favor of the ill-considered program of another of its bureaus, which would exploit the area, and in deference to political pressure. This fight is not yet over, of course, but the threat has for the moment been turned back.

However, the turning point to which we refer is symbolized by what is going on in the State of Washington with respect to Mount Rainier National Park. Governor Langlie of that State has appointed what he calls a Mount Rainier Development Committee. The basic philosophy of this group appears to be to bring pressure on the National Park Service to the end that the Park become a glorified recreational area for the large and growing populations of western Washington and Oregon. One of the projects proposed is the installation of a ski lift and tramway, and therein, we believe, lies the turning point.

If such an inconsistent and non-conforming use of Mount Rainier National Park is permitted by the Secretary of the Interior, then the door is thrown wide open for the same sort of improper recreational exploitation of the whole system of parks and monuments. If this plan is approved, then the policy of the government with respect to these areas will be one that betrays everyone who has fought for their protection, and will rob future Americans of a priceless heritage.

As this is being written Conrad Wirth, Director of the National Park Service, is in the State of Washington. He is holding meetings to learn both what the "developers" of the Park want and what those who are friends of the Park do not want. We know that Mr. Wirth is being eloquent in pointing out the special purposes for which this and other areas have been set aside; that he has explained what the Service pro-

poses in the way of development, such as providing better access and facilities on the east side of the mountain, keeping the road open in winter to Paradise Valley, and such. On the recommendations that he will have brought back—before this comment sees print—and on the expressions of opinion sent to the Secretary of the Interior, Douglas McKay, future policy will be determined.

A disfiguring tramway and ski lift—a permanent, year-around installation—is as much out of place in Mount Rainier National Park as would be a juke box beside the altar of one's church. Both would be a sacrilege. We stand before the altars of our churches in worship of our Lord. Mount Rainier is a great masterpiece and manifestation of God through Nature. How people who live where they are privileged to look at this great peak, wrapped in its glaciers and snow, glowing in the sunrise or sunset, can seriously wish to mar its beauty is beyond our understanding. And those of us, all over the United States, who own this Park, equally with the people of Washington, also have an important stake in its preservation.

We believe that under no circumstance should this installation be permitted. Close to the National Park and on U. S. Forest Service land, is an excellent skiing area known as the Corral Pass region. Proposals have already been put forward for ski and winter sport installations there. It is our understanding that the Forest Service, in connection with its recreational program, has no objection to such a development.

Indeed, the States of Washington and Oregon are rich in recreational areas. Within the boundaries of the National Forests in both States are ample opportunities for those who find rest, recreation and relaxation in the outdoors. There already exist excellent ski areas, and if the Corral Pass proposal is really needed it will be built. Exploitation of Mount Rainier, therefore, is as unnecessary as it is indefensible.

We have no doubt that Director Wirth has heard many disclaimers of any intent to establish a precedent. People may disclaim until they are blue in the face, but precedent it would be. More than that, it would be the establishment of a new National Park policy in direct negation of the fine concept that has brought about the creation of the system and that has protected that system for the past forty years. We find it difficult to believe that Secretary McKay, a son of the Northwest, will lend his support to such a drastic and dangerous reversal of policy as is now proposed by short-sighted exploiters.



On the campus of Antioch College, Yellow Springs, Ohio, are the "yellow springs" from which the town takes its name. Saffron-hued by chalybeate deposits, the springs have been preserved in their natural beauty as they were in the days when Shawnee braves paused beside their trail for a cool drink.



## Antioch's Glen Helen

By MARGARET M. JACKSON

*Photographs by Marvin Blosser*

**A** NATURE program links students at Antioch College with residents of Yellow Springs, Ohio, the community in which the college is located. "Town and gown" meet on friendly terms in the outdoor world. They share an enthusiasm that keeps them from flipping matches out of car windows, gouging trees, or stripping dogwoods of their blooms.

The center of their common interest is Glen Helen, a 1000-acre tract of forest, streams and farmland, which is an integral part of the Antioch campus. Hugh Taylor Birch gave and endowed the Glen in memory of his daughter Helen.

Glen Helen has a history. In its boundaries two Neolithic skulls have been found, and a recently unearthed skeleton is now being evaluated by Antioch's anthropologists. A main Indian trail, the Bullskin Trace, ran through it. Shawnee lovers, tradition says, trysted at the cascades above the Glen's "yellow springs," from which the nearby village derives its name.

In the early 1800s, families jolted in stagecoaches from Cincinnati to take the "rheumatism cure" at the springs. Traces can be found of bathing holes used by "water cure" faddists of the 1850s. There is an old cellar, all that is left of the homes of freed

slaves who settled in the Glen in 1865, along an "underground railway" route. An abandoned mill, half-decayed, marks another chapter in the Glen's life.

More recent Glen developments are three farms, a State-planted experimental pine plot, and a marked Nature trail through the wooded section.

When Dr. Kenneth W. Hunt became director of Glen Helen in 1946, he found it to be a center of campus recreational activities and an adjunct to the college's physical education program. Geology, botany and biology students gathered firsthand knowledge from its woods and streams.

Dr. Hunt saw outdoor education and recreation as a program not only for the college, but for the entire community, and especially for nearby children. In 1949, the experimental pine plot was leased without charge by the Glen to Bryan High School in Yellow Springs, and became the first recognized school forest in Ohio. High school students handle the business management of this plot: plant and harvest trees, conduct an annual Christmas tree sale, which provides funds for school activities.

For the past four years, Antioch students have led after-school Nature walks for grade school youngsters. Through these walks, prospective teachers learn to handle groups of children. Biology majors, and those

Youth leaders from many parts of Ohio visit the Glen Helen forest on the Antioch College campus each Spring for first-hand training in outdoor lore.



who plan careers in camp management, forestry, or conservation management, find that the work with children is helpful, and also fun. The walks teach youngsters "good uses" of the countryside. Nature collections and displays of all sorts are encouraged.

Trailside Museum, completed in 1952, is headquarters for these walks and for activities of college students. Most of the material for Trailside came from the Glen's managed forest area, and it was built largely by student labor.

The Mill Run camping area, now being developed, is the scene each spring of a weekend spring conference for youth leaders within a fifty-mile radius. Dr. Hunt proposes to create a regional school camp as "an outdoor education headquarters for southwest Ohio." His plan is to make such a camp available for lease, for weekends or longer periods, to public school groups, college workshops, or conferences.

Antioch's physical education department tries to give students recreation habits that will stay with them through life. To this end, Glen recreation includes rock climbing, camp crafts, hikes and cook-outs, and canoeing. A favorite diversion is "roving," which consists of a dog-trot along the woodland paths.

The Glen farms provide opportunities for student employment and also for research and long-term planning. Roger Collins operates one farm on a plan worked out with the local Soil Conservation District. On a second farm, Roger Lorenz is carrying out research with funds supplied by the Soil and Health Foundation. Antioch's chemistry, biology and earth science departments serve as advisors.

Projects in tree-breeding research, forest management and research are under development in Glen Helen. Constantly in progress are improvement cutting, fire and insect control, planting, harvesting, silvicultural management, and ecology studies.

Dr. Hunt wants to organize a Glen Association of

Antiochians, residents of Yellow Springs, friends, and Glen personnel. Naturalist hobby groups and outdoor festivals are two programs for such a group.

Also in the future is a "community common" for residents of Yellow Springs. Dr. Hunt wants to see the people of the community develop such an area, form the habit of spending their leisure time in an outdoor setting that they themselves have created.

Kenneth Hunt's philosophy is permeated with his desire to help the average person to understand the urgent need to conserve the nation's natural resources, and, even more, to help that person to know, enjoy and possess the world of Nature.

"If they feel it is theirs, they will want to protect it," is the way he puts it.

To this end, the Glen's director has sought to make Glen Helen first of all a part of the daily life of Antioch students, and of those who live nearby. He has reached out to attract the children who, as adults, are going to make or mar the nation's parks and forests. He has tried to show future teachers how to take their pupils with them to the outdoors in the process of education. He has passed on to individual Antioch students the kind of vision that has sent many of them into careers allied with the world of Nature, such as forestry, conservation, or camping.

Dr. Hunt's program reaches into the future. What has been done is only a part of a growing, purposeful plan. Each project that is started suggests a dozen other possibilities.

Among the shadows of Glen Helen's 250-year-old oaks are the echoes of the Indian runners who once sped by, the runaway slaves who crouched there, the sedate May walks on which Antiochians were led by their first president, Horace Mann, and the prim Antioch co-eds who, in days gone by, entered the Glen only on days when no men were allowed in its preserves.

One hears those shadows murmur, "What next?"

## Bells of Erin

By RALPH J. DONAHUE

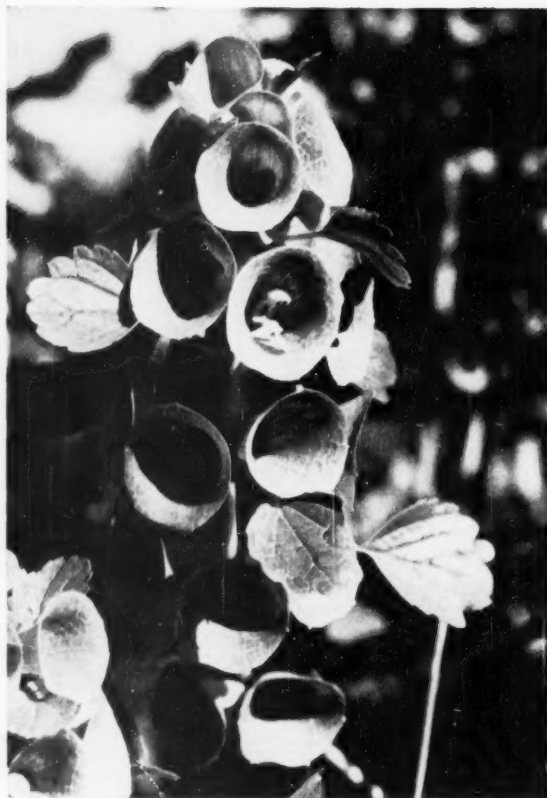
**S**EED catalogs call the plant "Bells of Ireland." Botanists term it *Molucella laevis*. It is also called shell flower and molucca balm. But we who have some Gaelic blood in our veins, name it "Leprechaunia," for, indeed, it is an unusual plant, full of surprises and strange tricks.

The bell-shaped calyx is comparatively large, and the flowers are so thickly clustered along the stalk that the leaves need long stems to get their share of sunlight. The calyx is a bright translucent green, interlaced with ivory veins. The single flowers, one to each circular, outflared well of green, are not nearly as large as one would expect from the calyx.

The bud, first noticeable deep within the "bell," is a tiny, greenish-white pearl. It grows rapidly, however, and attains the size and shape of a split pea just before it bursts into full flowers, which are white with lilac shadings. Viewed as it grows, the bloom bears a striking resemblance to the conventionalized drawings of a dragon's head, open mouth, sharp teeth and all. But turn the bottom rim of the calyx uppermost and you see an image of the loveliest white dove, its snowy wings extended in sailing flight!

After the bees have visited the blossom's nectaries, the dragon-dove fades out, to be replaced by a cross-marked emerald! This gem glistens in its little green well for a time before turning brownish. Then the cross-marking becomes lines of division between the four seeds that have developed there.

The plant grows into a rounded bush, about knee-



PHOTOGRAPH BY THE AUTHOR

high. The small, long-stemmed leaves are scalloped-edged, fan-shaped and few. Bells of Ireland is easy to grow, finding place about midway between the tall flowers and those that hug the soil. It lends grace and a thoroughly distinctive charm to the garden.

## Grunt Fish

By JAMES WOOD

Photograph by M. H. Wood



**A**LTHOUGH it grows only to three inches, *Rhamphocottus richardsoni* is the rather imposing name for the "grunt fish." However, this little fellow seems to justify its big name by its adventurous spirit. Not only does it seek the dangerous environs of 90 fathoms but it has the audacity to emerge along the shoreline of the beaches and to crawl deliberately over the rocks and seaweed on his long, pectoral fin rays. And it can survive in water temperatures ranging from 70° Fahr., as found along the beaches of sunny California, to the bleak and cheerless 40° Fahr., seas of

northeastern Alaska. Also this strange little fish, when so inclined, can roll its eyes independently of one another, the dark streak on the eyeball moving past the surrounding area so as to give the effect of winking at the observer. When trapped and removed from the water this independent and fearless mite gives forth a sound that is half grunt and half hiss, which accounts for the popular name. Technically it belongs to the family of "big headed sculpins." The photograph is of a two-inch specimen found at low tide in a small harbor near the entrance to Puget Sound.





# Of Bugs and Boys

By GLENN W. KERFOOT

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Two members of the Annex Entomology Club watch for some specimens worth collecting on a field trip. At the right, author of this article, swimming and weight-lifting coach, who, like other supervisors, has been called into service because of the absence of Gus McKeiver, who started this successful hobby for the boys.



**I**T MAY seem a far cry from the mayhem, thievery, and vandalism believed characteristic of our highly-publicized "juvenile delinquents" to the pursuit and study of butterflies, but it is an old story to those familiar with the work of Gus McKeiver and his Annex Entomology Club. This unique organization draws its total membership from the boys at the Annex of State Training Schools for Boys at New Hampton, New York, an experimental youth training center established seven years ago by the State Department of Social Welfare. This center is devoted to the rehabilitation of boys with emotional and per-

sonality problems so severe as to be deemed untreatable in other institutions. The Annex is directed by Dr. Benjamin J. Hill, an education specialist.

The entomology project was inaugurated in 1949 by Mr. McKeiver, supervisor of senior boys at the school. He believed that the study of insects would provide a new interest for his youthful charges, and an educational pastime of value in relaxing nerves grown taut by the relentless pressures of institution life and general emotional instability. Such a program was a "natural" for McKeiver, who first had become interested in butterflies as a boy in South Carolina.

Many of the tropical butterflies he collected in the South Pacific, while serving with the armed forces, are in collections throughout the United States.

At first, many observers felt that Nature study could not attract and hold the interest of boys born and raised in New York's slums. It was declared that these youngsters prided themselves on their "toughness." But the project was given the green light, and "Operation Bugs," as it was jokingly called, got under way.

The boys, however, displayed an immediate and genuine interest in this activity, although there were difficulties, not the least of which was an unfortunate lack of funds for the purchase of needed equipment. In addition, the collecting of speci-

Display of the collection of the Annex Entomology Club at the Middletown, New York, Savings Bank. Such displays are often presented.

PHOTOGRAPH FROM MIDDLETOWN TIMES-HERALD



Gus McKeiver holds one of the framed collections and one of the members of the club admires it.

mens was limited to the school's outdoor recreation area, which covered less than half an acre. These and other problems, however, proved a challenge rather than a deterrent to the club's activities.

In lieu of factory-made equipment each boy made his own outfit from castoff materials. Nets were constructed from wire coat-hangers, broom handles, and discarded curtains supplied by staff members. Small bottles of fly-spray and a medicine dropper became killing agents. Spreading-boards made from scrap wood, pins, and shoe-strings were used to spread and dry the colorful butterflies and moths for mounting. Battered picture frames were rescued from the junk heap, refinished, and pressed into service as mounting frames.

The club's headquarters, a small storage room at the school, resembled a Victorian attic, but from its cluttered confines have come a variety of attractive and serviceable items such as coffee-tables and serving trays, so beautifully constructed as to belie their humble origins. Such craft projects keep the members busy indoors during the winter months, when outdoor activity is limited to an occasional field trip to collect cocoons and egg sacs. In the summer, the club's primary activity is the capture and storage of butterflies. Such continuity makes the entomology group one of the school's few year-round activities.

Today, after five years of successful operation, the program still provides countless hours of stimulating recreation for the boys at the Annex. Although all of the original members were "graduated" long ago, the club remains one of the most popular features of the school's varied hobby program.

Weekly meetings are conducted on Wednesday afternoons, during which various phases of the hobby are discussed by the members. Mr. McKeiver presents new material culled from newspapers and magazines. This is examined by the group before being added to the club's extensive files on insect study. Occasionally a film is offered.

From April, when the elusive mourning cloak first puts in an appearance, until autumn, Annex boys can be observed roving the school property with their nets. A day's catch will include monarchs, swallow-tails, sulphurs, and other species.

The school entrance, illuminated at night by a



powerful floodlight, yields a bonanza of moths, attracted there during the warm summer nights. A morning's "harvest" may include the pale-green luna, noted beauty of the insect world, as well as specimens of cecropia, polyphemus, io, and many smaller but equally attractive night-flyers.

The club is frequently requested to prepare exhibitions of their work for display purposes, and the boys are always delighted to respond to such invitations. Their attractive exhibits have appeared at hobby shows, libraries, and in shop windows of the nearby communities of Middletown and Goshen, and are an annual feature at the Orange County Fair in Middletown.

Visitors to the Annex are surprised by the useful work being done by the boys, and many ask to purchase ashtrays and serving trays decorated with the iridescent butterflies. "There's a psychological reason for this," maintains Mr. McKeiver. "In the winter folks enjoy looking at butterflies because they are reminded of the good times they have outdoors in the summer. It's like having a bit of spring and summer with you all through the year."

The Annex Entomology Club is truly filling a need, and for proof of this one need go no further than the boys themselves. Gilbert, possibly the club's most enthusiastic supporter writes, in a memo retained in the files: "Entomology is real fun! It gives a boy something to do and a chance to learn something. You use your mind and your hands. I never had a hobby in my life before and I am grateful to Mr. McKeiver and the school for providing me with one I like and hope to keep always."

Could one require a more eloquent testimonial to the glowing success of Gus McKeiver's "Operation Bugs"?

## Tufted Titmouse

By RAY ROMINE

Impertinence personified,  
This tufted bit of pep and pride!

Like a human wolf, he cocks his eye  
And whistles at each passerby.

# Elliott Coues

By W. L. McATEE

THE NAME Coues, most persons need to be informed, was pronounced Kouz. Customarily it was not changed in the possessive case, two sibilants together apparently being regarded as unpleasant. Thus we hear of Coues' "Key," and so it has been since 1872. The *Key to North American Birds*, . . . at present known, . . . north of the Mexican and United States boundary, then in its first edition, was a single volume of some 360 pages, illustrated by 6 steel plates and upwards of 250 woodcuts. In its fifth edition (in 1903, after the author's death) it consisted of two volumes totalling about 1200 pages with 747 illustrations. The sixth edition (1927), except for a foreword, was a reprint of the fifth. The "Key" dealt with fossil as well as living birds, included a general essay on ornithology, an outline of the structure and classification of birds, and a manual of collecting, preparing, and preserving them. It made a practice of explaining the derivation and meaning of technical terms, including the scientific names of the birds, and was doubtless the most useful work in developing ornithological scientists that has ever been published.

Its author, Elliott Coues (1842-1899), while known chiefly as a student of birds, made his mark also in the fields of mammalogy, herpetology, bibliography, and lexicography, and was our most productive editor and annotator of the journals of early western explorations.

Born in New Hampshire, Elliott, when eleven years old, was moved with the family to the District of Columbia, which was his home thenceforth, except during periods of assignment, or travel, connected with his varying occupations. He was educated in Gonzaga Seminary and Columbian College (later George Washington University), receiving from the latter institution the degrees of A.B. in 1861, and M.D. in 1863.

Washington, the Smithsonian Institution, and its Assistant Secretary, Professor Spencer F. Baird, provided opportunity and stimulus for the pursuit of ornithological studies, but the enthusiasm was innate and had been since childhood. The first bird that seized his attention was the scarlet tanager "whose encrimsoned body, contrasting with wings and tail as black as night" are enough to enthrall any budding ornithologist. He describes the event in a passage that would now be called "purple prose," and which we quote:

"I hold this bird in particular, almost superstitious, recollection, as the very first of all the feathered tribe to stir within me those emotions that have never ceased to stimulate and gratify my love for birds. More years have passed than I care to remember since a little child was strolling through an orchard one bright morning in June, filled with mute



Elliott Coues, 1842-1899

wonder at beauties felt, but neither questioned or understood. A shout from an older companion—"There goes a Scarlet Tanager"—and the child was straining eager, wistful eyes after something that had flashed upon his senses for a moment as if from another world, it seemed so bright, so beautiful, so strange. "What is a Scarlet Tanager?" mused the child, whose consciousness had flown with the wonderful apparition on wings of ecstasy; but the bees hummed on, the scent of flowers floated by, the sunbeam passed across the greensward, and there was no reply—nothing but the echo of a mute appeal to Nature, stirring the very depths with an inward thrill. That night the vision came again in dream-land, where the strangest things are truest and known the best; the child was startled by a ball of fire, and fanned to rest again by a sable wing. The wax was soft then, and the impress grew indelible. Nor would I blur it if I could not though the flight of years has borne sad answers to repeated questionings—not though the wings of hope are tipped with lead and brush the very earth, instead of soaring in scented sunlight. . . ."

Thus it is clear that Coues was a born ornithologist. Whatever the demands of schooling, birds were always a collateral study, done to such purpose that by the time of college graduation, he had prepared, in collaboration with a friend, D. Webster Prentiss, a creditable list of the birds of the District of Columbia. This was published by the Smithsonian Institution in 1862, and in revised form as the *Avifauna Columbiana* in 1883. It is notable that many of the illustrations of birds in this publication were from Coues' pen. Together with others made later, they were reproduced in the several editions of his "Key."



In 1860, between the junior and senior years of his college course, he accompanied an expedition to Labrador under the leadership of J. W. Dodge. Charles Hallock, afterward a long-time editor of *Forest and Stream*, also was a member of the party, and from a letter by him we learn that, at least a hope in connection with the trip, was that of finding a last lingering great auk, but inquiry among the Eskimos and from agents of the Hudson's Bay Company yielded no trace of the bird. Hallock wrote, "This was Coues' initial trip afield and he did well; stuffed birds like a Christmas cook. He was then 17 years old."

Coues prepared an account of this expedition that was published in the *Proceedings of the Academy of Natural Sciences of Philadelphia* in 1861. In the same volume appeared two technical papers, resulting from study of the material collected, in which he described, as new, four species of birds. Thus was launched his career as a systematic ornithologist, on which he continued actively for about twenty-five years, and intermittently thereafter. He was a prolific writer, and in 1881 listed three hundred titles of papers on birds. Subsequent publications fully doubled the roster.

These were by no means mere notes or leaflets but included critical taxonomic papers, check-lists of North American birds, the various editions of his "Key," and volumes on *Birds of the Northwest* and *Birds of the Colorado Valley* (each of these two exceeding eight hundred pages). To the last-named publication was appended the first of his invaluable contributions to ornithological bibliography—a list of faunal publications relating to North American ornithology, 1612-1878. Later installments pertained to Central and South America and the British Isles, and to systematic papers on North American birds. How Coues, in his busy career, found time for the exacting labors of such extensive bibliography is a mystery. At length, he could no longer do it, and in 1897 he offered to turn over his unpublished accumulations to any qualified person who would undertake to continue the work, remarking that, "It takes a sort of an inspired idiot to be a good bibliographer." Apparently no such person volunteered, and it is not known what became of these bibliographical notes, nor indeed of any of his literary remains—a great loss.

To trace Coues' vari-sided career, it is necessary now to revert to the time of his leaving college. That was in the Civil War period, and in 1862 "he enlisted in the United States army as a medical cadet; he was promoted to acting assistant surgeon in 1864, serving in that capacity until 1881 when he resigned from the army to devote his entire time to scientific and literary

pursuits." His active and acute mind was employed in the improvement of every field in which he engaged; and this period was marked by contributions on anatomy, and on operative procedure. Perhaps an underlying incentive to joining the Medical Corps was the opportunity it promised for seeing the country. At any rate, beginning in 1864 he was stationed at various

posts—Fort Whipple, Arizona; Fort Macon, North Carolina; Fort McHenry, Maryland; and Fort Randall, Dakota. Natural history was avidly studied at every opportunity, and a broad, practical foundation of first-hand knowledge was thus laid for his publications on birds, mammals, and local zoology.

While at Fort Randall, in what is now southeastern South Dakota, Coues was assigned (1873-1876) as surgeon and

naturalist to the United States Northern Boundary Commission; and from 1876 to 1880, he was detailed as secretary and naturalist to the United States Geological and Geographical Survey of the Territories. In these periods, closing his service in the Medical Corps, he was enormously productive. Then appeared his most important papers on mammals, including a synopsis of the Muridae (mouse-like rodents), and of the Geomyidae (pocket-gophers), Mustelidae (weasel allies), and other groups. There were notable local reports on both mammals and birds, and his two large volumes on western birds were published in those years.

An overlapping activity for one whose hands would seem already to have been overfull, was conducting the department of anatomy in Columbian University from 1877 to 1886. Again, overlapping, was his editorial work on the *Century Dictionary*, for the first edition of which Coues had charge of the departments of general zoology, biology, and comparative anatomy. He furnished some 40,000 definitions and supervised the preparation of hundreds of illustrations. The policy of having experts, such as Coues, draw its definitions made this encyclopedic dictionary the best work of its kind that has ever been produced.

Among the reports appearing in Coues' term of service with the forerunner of the present United States Geological Survey, was "An Account of the various Publications relating to the Travels of Lewis and Clarke, with a commentary on the Zoological Results of their Expedition." That was in 1876, and it was the first fruits of an interest in the original records of western explorations that continued all the rest of his life. Further reports on the Lewis and Clark (the correct spelling) Expedition (1804-1806) were issued in 1893; on the travels of Zebulon M. Pike (1805-1807 in 1895; Alexander Henry (Continued on page 442)

## Loon Lake

By SARA KING CARLETON

He moves, a shadow, in this interval  
Of early dusk, his disembodied call  
As unsubstantial as the mist, as thin  
As the pervasive darkness closing in.  
Far off across the marsh we hear his cry  
In hollow waves that hover and rebound  
From shallow hills, an incantative sound  
That echoes in our thought, a mournful mood  
Of melancholy and all solitude.

# Knowing Wildlife on Its Terms

By MORLEY COOPER

**I**N TWENTY years of living in wilderness areas—in mountain, desert, and lake country—I have found it necessary to revise a lot of my notions about wildlife.

At first I regarded everything that was classified as "game" as something to be killed when opportunity afforded and the season warranted. Other creatures—such as songbirds and small rodents—simply were to be ignored.

Before long, however, I concluded that much of this attitude was a sort of carry-over from the viewpoint of my progenitors. We no longer needed the flesh of these birds and mammals as food, and found more enjoyment in getting acquainted with living specimens of wildlife. We did not even wish to trap these creatures. Thereafter Madge and I became genuinely interested in all types of mammals, birds, and reptiles, regardless of whether they were edible, or perhaps were considered hazardous to approach.

We made the discovery—surprising to us—that



The confidence of the chipmunk can be rather quickly won, provided the food offered is satisfactory. It takes longer, however, to gain acquaintance with the kangaroo rat (left), but the author made friends with so many of these interesting little rodents that he almost ran out of names for them.

most of these creatures wished to be friendly, and would become so if we did not molest or restrain them. This led us to adopt an entirely different relationship with all wild folk, and in turn they soon lost their fear of us. The results were sometimes surprising and often embarrassing.

We camped in the Colorado Desert, for example, simply because we thought a portion of it offered the greatest seclusion for writing. It was only by happenstance that we discovered this area to be teeming with wildlife of many sorts, mostly nocturnal by nature and therefore in evidence only around dusk.

We first made friends with scores of birds simply by setting up two crude bird baths, about a hundred yards apart, and keeping these full of water. Thereafter every bird within a considerable radius of our camp found occasion to visit us at least twice daily, principally the seed-eaters such as the linnets and desert sparrows. Then the bug-eaters—verdins, martins, and phainopeplas—made the vicinity of our camp their headquarters and were always well received. Some of these birds did not get along well together, hence the two bird baths. The only bird

we barred was the shrike, or butcher bird, who might wish to kill some of the smaller songsters. Whenever one of these showed up, the other birds set up a real fuss and I would get my little .22 and finish off this predator. Except for killing rattlesnakes, this was the only shooting we ever permitted in that area.

There were quite a few diamondbacks and sidewinders thereabouts, and we made it a point to thin these out as quickly as possible. Both the birds and small mammals appeared to appreciate this and watched with interest while we killed the killers.

Our most friendly neighbors, and there were scores of them, were the *Dipodomys*, commonly called the kangaroo rat, a rodent with silky fur, a long tail, and with never a flea. This fellow lives underground, and I had been told that he could not be cultivated in his wild state.

I now am on good terms with thirty-five of these animals, each of which responds when he is called, even at noontime. They have powerful jumping legs, tiny forelegs, and love the nut kernels and bread crusts we offer them. They move at blinding speed, and, for their size, can outjump any living creature, making leaps of fourteen feet when in a hurry. That is equivalent to a man's jumping 200 feet.

It took me nearly six months to get the first of this species to eat out of my hand, whereas a trusting mountain chipmunk would get chummy within three days. But the "dip," once he recognizes your voice, will come to you across the desert when called, hesitate a moment, and then rise in a tremendous leap that puts him on your shoulder. At once he expects to be fed, and his cheek-pouches hold a lot of food—nut kernels, bread crusts, and such.

We made it a practice to give names to all of these visitors, and after a time nearly ran out of simple cognomens for them. Beginning with Jimmy and Susie, we finally were using Skippy, Skeezix, and Sooky. They learn to respond only to your voice, therefore you do not render them vulnerable to anyone who may wish to kill them just for fun.

My only experience with a diamondback at close quarters was purely accidental. In this case he was coiled down in a concentric circle, head flat in the sand, directly in front of one of the kangaroo rat burrows, and I did not see him until he was within striking distance of me. Thereafter there was nothing to do but hunker down and attempt to talk him out of this idea. When he finally got tired of having me around, he slowly uncoiled and started across the desert, disgusted at being cheated of his "dip." Thereafter I finished him off, never knowing when someone might accidentally step on him.

Skunks have proved friendly and well behaved, as have porcupines. One female skunk, raising her young in coyote country, conceived the idea of bringing her infants into our foothill camp every night, knowing the coyotes would not molest them there. She was polite and never caused me trouble, although



A vireo is a fascinating bird, most busy during the nesting season, but one that can be attracted by proper methods.

she would never eat out of my hand. The babies were not so trusting, and would whirl about, raise their tails and attempt to annihilate me. Evidently, however, their glands were not yet working.

I have never been able to tame a coyote, but can approach closely to either this wary animal, or to a jackrabbit or a fox. Erle Stanley Gardner once tamed a coyote, but, although he put up signs on his ranch pleading with hunters not to kill his pet, some trigger-happy lad finally shot him.

Porcupines make good pets and can actually be tethered if a dog-collar is placed behind their front legs rather than about the neck. They are extremely greedy and can be petted without raising their quills when well-fed, provided you do not touch that large, nervous tail. The nicest thing about getting acquainted with any of these animals is that you do not thus render them defenseless against predatory humans, since they learn to respond only to your voice.

Near the badlands back of Fallbrook, California, I found the great footprints of a cougar embedded in the soft earth of my vegetable garden. She was probably one of the last of her kind in that area, and during the breeding season she made the rounds of the nearby ranches in search of anything she or her young could eat. How she survived there is really a mystery.



I began leaving out food for her on her weekly visits, and then one night I waited up for her. When she appeared I began talking to her in casual fashion. She leaped away, but soon came back and picked up the food. Thereafter I got on pretty good terms with her, and if she had continued her visits I think she would eventually have eaten out of my hand. But the closest I got to her was six feet. However, I think she lost all fear of me, and I enjoyed her visits.

If you are interested in getting acquainted with wildlife in its free, uncaged form, here are a few suggestions.

1. Feed the animals well.
2. Never attempt to restrain them. Sometimes I like to tweak the long tails of a "dip," but they do not take this amiss, only jumping about four feet into the air.
3. Keep dogs and cats away from wildlife. These lovable pets regard it their duty to exterminate wild creatures and birds, and all wildlife is aware of this fact.
4. You can practice getting acquainted with wildlife in your own backyard, in the desert, mountains, or in the foothills. Once any creature decides you mean him no harm, he will come at your call. And, of course, you always have food for him.
5. This method of meeting wildlife is fascinating, and calls for no equipment nor any particular knowledge of natural history. Your technique is exactly the opposite of that of the hunter or the bird-watcher, since you talk to the wild folk all the time, and your pleasure never depends on whether or not you know their common or Latin names. That beautiful desert phainopepla, for example, was my good friend for three years before I knew any other name for him than "Blacky."
6. Do not frighten any wild creature by taking flashlight photos of him. Naturally this sort of thing scares him. And you can get good photos of most forms of wildlife—even nocturnal animals—near dusk with fast-action film, once you become acquainted with them.
7. The size of a wild animal is no criterion of the



A porcupine is curious and greedy but with the proper approach it can become a most interesting wild acquaintance.

difficulty of getting on good terms with him. Most of us have seen tame deer and bears. But the smallest of animals—such as *Dipodomys*—have many enemies in the air, under ground, and on the surface, and must be forever careful. When you win their complete confidence you have really accomplished something.

8. Let me repeat that any animal will learn to recognize you as a friendly individual—both by your voice and by your clothing. Change either and he will not continue to show himself. On the other hand, once he "shows," you may introduce him to other humans and he will accept them as friends—so long as you are present.

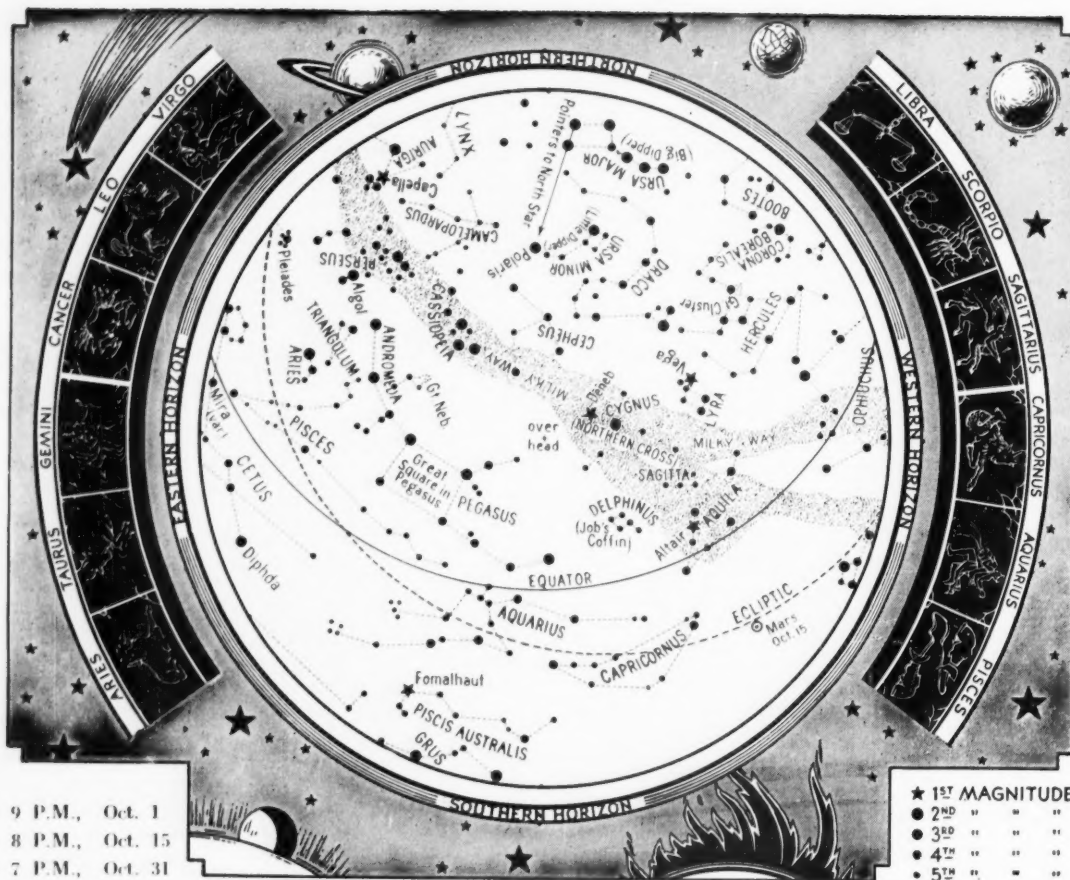
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## Desire

By JOHN GALLINARI WHIDDING

Intruding on the toothsome themes  
Of bones they used to know,  
The full moon wakes from gourmet dreams  
A thousand dogs or so.

Resembling much the well-licked dish  
Each cleaned of food tonight,  
She draws from them the town-wide wish  
That barking dogs *could* bite!



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

# The North Star and The Dippers

By ISABEL M. LEWIS

THE AXIS of rotation of the earth, or the polar axis, as it is also called, meets the surface of the earth in the two diametrically opposite points known as the north pole and south pole of the earth, and, extended to meet the celestial sphere, in the north and south pole of the heavens.

Although there is a dearth of bright stars in the vicinity of the south pole—the nearest bright star being the third magnitude star, Beta Hydri, 12½ degrees from the position of the south pole of the heavens—the north pole of the heavens is well-marked. The North Star, Polaris, lies now only about one degree from the position of the north pole of the heavens. As a result of what is known as the Precession of the Equinoxes, the causes of which we cannot go into here, the celestial pole describes a nearly circular path, with a radius of about 23½ degrees, around the pole of the

ecliptic in about 26,000 years. In the same time, also, the equinoxes, or points of intersection of the planes of the celestial equator and the ecliptic, complete a circuit of the heavens, backing around through all the constellations of the zodiac in east to west direction. It follows that, in the course of time, Polaris will cease to be the North Star. One may have no immediate concern about this fact, however. Polaris is now drawing nearer to the position of the north pole. Its minimum distance will be reached about the year 2100, when it will be less than half a degree from it. From then on its distance from the pole will increase. Alpha Draconis was the pole-star in 3000 B.C. Alpha Cephei will be the successor to Polaris in 7500 A.D. and Vega will be the most magnificent, although more distant, North Star, in 14,000 A.D.

The position of Polaris, which is itself a bright star

of the second magnitude, is so well defined that one should have no difficulty in finding it in our northern latitudes. One always associates Polaris with the well-known Big Dipper in the constellation of Ursa Major, Greater Bear, as well as from its position at the end of the handle of the less easily recognized Little Dipper in the constellation of Ursa Minor, The Lesser Bear. Above latitude 35 degrees North these two groups lie completely above the horizon at all hours and all seasons as they swing majestically around the pole. The seven bright stars of the Big Dipper have been known in other lands as The Wain, or The Wagon, and The Plough.

The two stars that are known universally as "The Pointers" are the two stars in the Bowl of the Big Dipper and lie opposite the handle. The more northerly of the two stars is Alpha Ursae Majoris, or Dubhe, a star that is exactly of second magnitude. The more southerly of the pair is Beta Ursae Majoris, or Merak, nearly half a magnitude fainter than Dubhe.

Other members of this well-known group are Delta Ursae Majoris, or Megrez—the faintest of the seven stars—of about  $3\frac{1}{2}$  magnitude at the intersection of the handle with the bowl; Gamma Ursae Majoris, or Phecda, of  $2\frac{1}{2}$  magnitude directly south of Megrez; and in the handle the brightest is Epsilon Ursae Majoris, or Alioth, and next to it, at the bend of the handle, the star Mizar, or Zeta Ursae Majoris, of about  $2\frac{1}{2}$  magnitude.

This last is the most interesting of the seven stars in the Big Dipper. With a small fourth magnitude star near it, known as Alcor, it forms a wide double star, which used to be, among the Arabs, a test of good eyesight. The pair was known also as the Horse and the Rider. Mizar is, itself, a fine double star, the first to be discovered telescopically; and the brighter of the two components was later found to be a spectroscopic binary, a double star that can be detected only with the aid of the spectroscope, which shows a doubling of the spectral lines of two components too close to be separated telescopically. This was the first spectroscopic binary to be discovered, 65 years ago, although many such pairs are now known to exist. At the end of the handle is the star Eta Ursae Majoris, or Alkaid, which is slightly brighter than the more northerly of the two Pointers.

If one follows the direction of the Pointers upward from the bowl to a distance nearly as great as the extent of the Big Dipper one comes to Polaris at the end of the handle of the Little Dipper. There are some who have difficulty in tracing the outline of the Little Dipper.

This is understandable since the three stars in the handle, with the exception of the second magnitude Polaris, are faint stars, as is also the star in the bowl below the intersection with the handle. Of the two stars that correspond in position with The Pointers in the Big Dipper the one at the top of the bowl is slightly brighter than Polaris and is known as Beta Ursae Minoris, or Kochab, while Gamma Ursae Minoris, south of it a little more than two degrees, is of the third magnitude. These three stars, two of second magnitude and one of third, are the only bright stars

in the Little Dipper as compared with the seven bright stars in the Big Dipper.

The stars of the Big Dipper are of special interest because of the fact that five of them—the exceptions being Dubhe, the more northerly of The Pointers, and Alkaid at the end of the handle—form a moving cluster sharing a common direction of motion across the heavens. These stars are all extremely hot and luminous bodies from fifty to a hundred times

more brilliant intrinsically than our own sun. Six other stars in the same general region in Ursa Major have been found also to be members of this same moving cluster, although they are fainter, cooler, bodies and of later spectral type, the least brilliant being of the same type and luminosity as our own sun. All eleven known members of this Ursa Major cluster are moving along parallel lines, and at nearly the same velocity, toward a point on the eastern boundary of Sagittarius or in the general direction of the center of our galaxy. This moving cluster of stars within our galactic system is only one of a number that have been identified and studied extensively. It is also the nearest to us of all of them at a distance of 75 light years.

The individual members of the cluster are scattered along an arc of less than thirty light years in extent, and which lies nearly parallel to the plane of our galaxy. No member is more than about 20 light years from the center of the cluster. All but three are within about twelve light years of it. Although the two extreme stars in the brilliant configuration of seven stars that form the Big Dipper are traveling through space in directions so different from that in which the five stars in the moving cluster are speeding, and will eventually destroy the familiar form of this beautiful group in our far northern skies, it will be little changed for some centuries to come. Polaris, too, may be depended upon not to change too appreciably its position relative to the north pole of the heavens for several more centuries. So Polaris and The Pointers will remain, for some generations (Continued on page 442)

## The Night of the Autumnal Equinox

By FLORENCE SCHNEIDER

The wind goes moaning through the trees tonight.  
The furtive stars swarm momentarily through space  
Before the scud obliterates their light.  
Excitement fills the air. With quickened pace  
Earth turns upon her axis. Now the sun  
Will make her southward journey. From this hour  
The course of day will be more quickly run;  
The nights will lengthen; frost will rime the flower  
As if the sun, on her celestial route,  
Had gathered star-flakes—then had thrown them out.



# The School Page

By E. LAURENCE PALMER

Professor Emeritus of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

## TWILIGHT OR DAWN

**T**HIS is written at the conclusion of a three-week trip through four mid-West States. I met with students, faculties and groups of educational leaders in ten different communities and talked with representatives from States from coast to coast and from border to border. I shall try to present here the essence of the philosophy expressed by those with whom I came in contact. I talked to several thousand people, from early morning to late at night, in the rain and bright sunshine, in steaming convention halls and in wind-swept fields, to the accompaniment of whip-poor-wills, snores, scuffling feet, blatting radios, crying babies and speeding jet-planes. A casual conversation with the president of a Kansas college set the pattern for this page.

As is so frequent when friends get together, the president and I did a bit of reminiscing. I rather think that he is young enough to be my son, but we have worked together for years and our educational philosophies are in close agreement. Our recent experiences had differed radically, and his remark that, in a mutually beloved institution, some of our philosophy seemed to be entering the twilight stage led me to counter that on the national and international stage it would be more appropriate to think that it was entering the dawn. With that we were in agreement, but as I have been thinking it over it is not so important whether it is twilight or dawn as it is that we are entering a period in which changes will take place. Who can say that day is always more welcome than the night? Certainly one does not look forward to the cool of the night with fear when one is experiencing a hot early summer afternoon in Iowa or Kansas.

The late George F. Warren, an agricultural economist, once rearranged the fences on his old farm and found that for years he had been failing to use the farm's richest soil, which lay along the fencerows. He suggested that the most fruitful fields of research might also be found in the borders between botany and zoology, biology and physical science, and natural and social science. Our wildlife managers preach the principle of edges, showing us that many wildlife populations reach their highest point where regions of good food come in contact with areas of maximum shelter. Is it not possible that, when night and day come together at twilight or dawn, highly significant changes take place, aside from changes in temperature and light intensity? Of course, we naturally think of old age as representing twilight, and youth as representing dawn, but look at the dead insects under a street light in early dawn, or think of a city night club after the sun has come up on New Year's Day. Somehow I find the greatest satisfaction when day and night meet at twilight or dawn, when winter and summer meet in spring or fall, when youth and maturity meet and adjust their differences and gain from each other, as they do at some of our major regional and national meetings of scientists and educators. What has worried me most about this scientist-educator business is the way in which each seems to try so desperately to remain in his own little niche and often to deny the worth of the other.

During this little tour of the mid-West, I heard of one important teacher training school that sought a chemistry staff member by writing to one of the major educational institutions of the East. Six candidates, all newly decked out with doctorates, were recommended for the position. Not one of them had had a single hour of chemistry since his undergraduate years and yet they were recommended to teach chemistry at the college level. This same institution placed a man in a major visual aid organization. He rewrote a script on insects, placing the bees and wasps as representative of the lowest order of insects. How can educators expect to gain any respect whatever from the scientists if they persist in recommending those with such quali-

fications as candidates for responsible positions.

I do not mean to imply anything sinister in the situation, but if I were the head of any foreign power dedicated to the destruction of American strength I can think of nothing that would make me smile more than to hear that in America responsible science teaching positions were being filled by individuals who were not adequately trained in the subject matter they were supposed to represent. I am frank in saying that I believe that we are doing that in many cases, and are likely to continue doing it until some sort of educational revolution takes place.

*Collier's* magazine recently published a facsimile of a biology examination given in a high school in Eugene, Oregon, in which the questions dealt only with the size of the field and the rules followed in playing football. The president of an eastern state teachers' college complained that the head of his biology department, whom he could not fire, devoted a major portion of a biology course to a consideration of the financial shenanigans of the life insurance game. If we take these incidents seriously, and I think we should, it may well be that the educational philosophy that children should do only what they want to do may mark a twilight period for sound science education. If we continue lowering the standards in elementary and secondary schools, and follow suit at the college level, it is only natural that the time should come when we will turn out doctorates at a dime a dozen with little other requirement than that they pay tuition for a given number of terms at an institution authorized to give the doctorate degree.

This last week I attended a workshop in conservation at a mid-West teachers' college. Because of wearying travel I went to bed at nine in the evening. Classes were in full swing at that time. I awoke at five in the morning to see forty of those who had been in class the night before off on a field trip to study birds. True, I lay in bed and heard three species not on their list when they were through, but the bunch was working; working under good leadership representing the best judgment of the leaders of the State involved, and seeing things for the most part in their natural setting. I am almost willing to wager that in the three weeks those teachers were in a summer workshop they got more basic science training than some doctorate candidates get in their whole graduate program designed to help them become science teachers. I listened to those teachers during some of their free time, and I am satisfied that, for them at least, that workshop marked a dawn in their educational experience. I rather think that twilight must be settling on some of our graduate schools, and it is the kind of twilight that will please immensely any force interested in weakening America's productive capacity.

This workshop for teachers that I have just seen in operation will have helped more than one hundred teachers this summer. At least four out of five of these teachers financed their own way, many of them leaving their families and giving up generous portions of their summer vacations for the purpose. I think that they offer us great hope for the future. I know of another workshop in another part of the country that this summer was financed by government funds. It reached fewer teachers, lasted for half as long. The participants made no financial contribution for instruction, food or travel. The federal funds spent on this second workshop would send, to the first workshop cited, with all expenses paid, three times as many students as it will serve. I am almost willing to wager that the long-time influence also will be greater when the participants make a sacrifice for what they get. Please do not assume from what I have written that I fail to recognize merit in subsidy. There are times when it is essential to existence, but the granting of such subsidy does not, as I see it, grant license to go on a spending spree, or relieve the responsible leadership from practicing a sensible economy.

If we accept twilight as a period preceding an undesirable experience, then it would seem to me that there is some evidence that the opponents of rugged individualism, of a growing economy, of a strengthening of individual capacity to produce and to serve society, may, in some areas, be gaining strength that will bring on some dark hours if not the dark ages. At the same time, other segments of our body politic, through sensible use of the resources they have at hand, are showing an awakening that

gives promise of a bright future. It is only natural that if there is a twilight at one spot and time there may be a dawn at another spot. I am positive that there is wholesome growth in the general recognition of the importance of conservation of our natural resources. It is almost like the dawn of a summer morning, when day bursts almost too suddenly once it gets on the job. I wish that I could look with equal optimism on what is happening at the higher levels in science education. Even there, however, there are rays of light that give us some encouragement, in spite of some depressing clouds.

The conservation idea has grown and is growing. Possibly it is well expressed by recognized definitions of conservation. For a long time conservation was thought of as wise use. In a way this definition was dangerous in that it implied that use was always necessary, when this may not be so. Then a group came forward with the idea that we should speak of resource use, with the ball frequently being carried by the social scientist, who spent most of his time on organizing human resources without feeling any great obligation of recognizing how the physical world works.

Then Aldo Leopold came along with the idea that conservation was the art of having man live in harmony with the land. He put a heart in the utilitarian disciplines of wise use and resources use, and while he employed academic strength he recognized something over and above intellectual management of a material world. At the meeting of the Outdoor Writers Association of America I heard a new definition, which I like. It suggested that conservation was the conscience of science. The more I think about that the better I like it. We cannot do without a material world. We cannot do without reasonable intellectual disciplines in our relations with that world. Somehow it must dawn on us that, in addition to the functional aspects of the world in which we live, we need a conscience applied to our behavior. We cannot create a conscientious behavior out of thin air, as some of our educators seem to be trying to do, any more than we can create a happy world through intellectual discipline and selfish use of our material resources. Maybe conservation in its finest and most recent sense offers us a dawn rather than a twilight to look forward to. Maybe also it will be necessary for us to go through a period of twilight and darkness to reach another dawn. At any rate things are looking up in some areas and I hope that you are where you can appreciate it.

#### National Parks

*The National Parks.* By Freeman Tilden. New York, 1951. Alfred A. Knopf, 324 pages. \$1.00.

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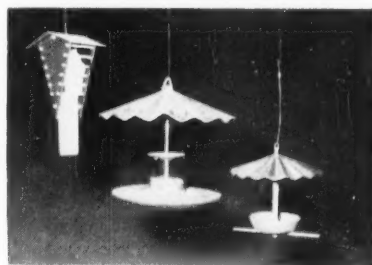
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Our own mood influences our opinion. At times we prefer a picture that makes us feel calm, as with this wood duck.



At times we may want to be inspired — by pictures that give us a feeling of space and freedom — as with these terns.

# Camera Trails

By  
EDNA HOFFMAN EVANS

**O**RIGINALLY I am not given to philosophizing, particularly about photography. This month, however, I am going to do some speculating on the subject of "What constitutes a good picture?"

That is a simple question—What constitutes a good picture?—but it cannot be given an equally simple answer. A good picture, I think, must meet certain technical specifications. That is, it should be in focus, and it should be properly exposed and printed. Then, so far as composition is concerned, the arrangement should give a pleasing result. These qualities are fairly definite and universal in their application.

From this point on, however, we become less and less definite. Whether we realize it or not, it is sometimes difficult to separate the subject matter from the picture. That is, if we like dogs better than lizards we will inevitably prefer a mediocre dog picture to a very good lizard picture. Or if we know from personal experience that it is harder to take one kind of a picture than it is another, we may tend to give the edge of "excellence" to the picture that presented more taking difficulties. Then again, our own mood influences our opinion. At times we may prefer a picture that makes us feel calm and relaxed; at another time we may want to be inspired, or amused. But the fact that one picture suits our mood and another does not has no bearing on the intrinsic worth of either of them.

There are, I think, many ways of approaching the problem of what is good in any field and what is not good. In my speculating, I am going to consider two widely different types of approaches. One is that of the artist, and the other that of

the critic. The artist is one who actually creates new things, while the critic mulls over things someone else has created.

The artistic approach is a creative approach; it stresses individuality and urges one to think for himself. The critical approach tends to hold one's thinking within rigid lines and is reluctant to accept new ideas. The artist takes a positive approach, noting the effect of techniques and deciding whether they have been used skilfully and to good purpose. The critic, on the other hand, tears into the work itself and tries to determine what the artist meant when he wrote, or carved, or painted some detail.

How does this artistic and this critical approach relate to photography? There is a close relationship, I think. Photography is a form of art, just like painting, music, and drama. Like other art forms, it is a personal thing, and each photographer is just as much an artist in his own medium as the sculptor is with stone, the poet with words, and the musician with sound.

As for binding photography down with special rules and interpretations, did Michelangelo, for example, laboriously plot every minute detail of his paintings beforehand? Was he consciously aware that one line should lead into another, or that a curve was needed here and a straight line there? Did Bach, or Chopin, or Verdi weigh each note before he played it? Did Shakespeare cogitate over each word, each phrase, each soliloquy before he wrote it? I say no, in each case. An artist creates because something inside him drives him to it, not because of what any rules tell him. If artists pondered as much as critics say they do, no great art would ever be created. The rules would have strangled any masterpiece before it was even begun.

Naturally, there are certain basic elements each artist must know. Usually he learns these from someone else, or, by a much slower process of trial and error, finds them out for himself. The painter learns about pigments, about colors, about the way to prepare a surface—be it canvas or wet plaster—to receive his painting.

The writer learns about words, how to spell them, what they mean, how to put them into sentences, paragraphs, and whole chapters. The musician learns not only about sounds and harmony, but also the physical mechanics of producing those sounds on organ, violin, or other instrument.

The photographer, for his part, must learn how to operate his camera. He learns first of all to hold it steady, he learns to focus it properly, to set lens stop and shutter speed to suit existing conditions. In the darkroom he learns about solutions, about papers, about toners—a host of chemical technicalities. He also learns to compose his original picture, to get the view he wants, and in the darkroom he learns to enlarge and to crop his pictures so as to get even more of what he wants from the resulting negative. But who tells him what he wants? No one, but there in that undefined area may be found the essence of what makes one picture better than another.

Perhaps the photographer is somewhat more restricted in his pictorial medium than is the painter. The photographer must work with things as they are; faith may move mountains, but not from the photographer's standpoint. The artist, on the other hand, can actively compose his picture; although painting from life he can still move objects around to suit himself. The photographer cannot do that.

Perhaps this is why some artists refuse to admit that photography should be included in the art category. And yet, if an equal number of artists and photographers were sent out to depict the same scene, each one would produce something different. Of course, the photographers' pictures might resemble each other to a greater extent than the works of the artists because the photographers were hemmed in more by physical limitations than were the painters. But in each there would be individual differences in composition, emphasis, and shading.

Photography, of course, is much more factual than drawing. Suppose, for example, you wanted an exact reproduction



of some object or scene. Which would you hire to do it, an artist or a photographer? The latter, naturally, because photography is more exact in the specific sense than drawing. There are both advantages and disadvantages to this.

In the days before the development of photography, it was the artist who gave the world his impressions of things—even of the things that today we would call news events. For example, when artists painted battle scenes, they tended to glamorize them, for various reasons. And look how glamorous people used to think war was—color and action, adventure and glory. Even the blood, and the soldiers with spears through their gizzards, did not look too horrible because the artist shoved them off into a corner and focused attention on the heroes of the picture.

But see how our attitude toward war has changed since the advent of photography. The cameraman gives us battle scenes (when such pictures are printed) that are anything but glamorous. He shows us tired, dirty, battle-worn soldiers; he shows us maimed victims, bomb-wrecked homes, hopeless refugees. You cannot glamorize these things.

Mathew B. Brady, the Civil War cameraman, was among the first to show us war without glamor. Not that Brady was consciously de-glamorizing war, for I do not think he was interested in anything but picture-taking. But he came along at the time when the photographic process had been developed to a usable stage, and also at the time when a War Between the States was shaking the very foundations of the nation. Through the lens of Brady's camera people saw war as they had never seen it before, except as eye-witnesses on the battlefield. From Brady's time on, wars have not ceased, but who, today, thinks wars are glamorous?

If art is an individual thing, as I have been trying to say that it is, then why have art exhibitions, why have camera clubs, and photographic salons, why have music teachers? The answers are simple—to learn from the other fellow, to see how someone else has done something effectively, and to contrast one person's work with that of another.

We know that some pictures are good and that others are not. We know that we like one thing while another person

likes something else. But to say that there is one, and only one, right way to take a photograph, paint a picture, write a play, a book, or a poem—or to imply that all people must see and react to works of art in the same way—is foolish.

To return to my original question as to "What constitutes a good picture?" I have not answered it, except in a very general sort of way, nor do I believe that it can be answered more specifically. A good picture gets that way by meeting certain technical specifications; but far over and beyond that, a good picture has something to say to the individual viewer that mere words cannot express.

**TIPS AT RANDOM** For proud new parents—and statistics say that there will be nearly four million new babies this year—Bell and Howell Company has prepared a neat how-to-do-it pamphlet called "Tips on Filming Baby." Designed for users of motion picture cameras, the booklet has as its theme "Where there is a baby, there is a good movie subject." Picture-taking techniques, equipment, lighting, props, and dos and do nots are given entertainingly and instructively. For a copy of the booklet, write to Bell and Howell, 7100 McCormick Road, Chicago 45, New York 10, or Hollywood 38. Mention "Camera Trails" and the booklet will be free.

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## ELLIOTT COUES

(Continued from page 432)

(1799-1814) in 1897; Jacob Fowler (1821-1822) and Charles Larpenteur (1833-1872) in 1898; and Francisco Garcés (1775-1776), posthumously in 1900.

A summary of these publications and an opinion as to their value by Dr. J. A. Allen, himself a great editor, is well worth quoting:

"These works forming fifteen volumes" consist entirely, except in the case of the expeditions of Lewis and Clark and Pike, of previously unpublished material and form a mass of new and original information on early explorations in the West of the highest interest and importance. They are all copiously annotated in reference to the geography, ethnography, and general natural history of the regions traversed by these various explorers, with the usual care and accuracy characteristic of Coues. . . In order to secure geographical correctness as to localities and the precise routes. . . he traveled many thousands of miles over the same routes, these journeys including a personal examination of the route of Lewis and Clark, a canoe trip up the Mississippi to determine Pike's route to the headwaters of that river, and an effort to locate the trail of Garcés. His admirable equipment for this kind of editorial work is beyond question, and these volumes will ever remain a monument to his industry, and intimate knowledge of early conditions in the West, while the information thus made available provides a mine of wealth for future historians."

A chapter in Coues' life, difficult for fellow-scientists to understand, was an incursion into the realms of spiritualism and theosophy. As with other fields of interest, he cultivated it intensively, editing books, and publishing brochures of his own, upon it. He was active in theosophical organizations, and came into competition for leadership of the movement in America. Then something happened; he became critical of the "patron saint" of the order, Madame Helena Blavatsky, and was expelled from the Society.

Stray as he did, Coues' career was predominantly ornithological. He was one of the Founders of the American Ornithologists' Union, its Vice-President for ten, and its President for three, years. He was for many years Chairman of its Committee on Nomenclature and Classification and had much to do with drafting the A.O.U. Code of Nomenclature, a most influential document, published in 1886.

He and some of his colleagues among the Founders of the American Ornithologists' Union were the builders of the edifice of North American bird study. They were the creators, the architects, and successors can make only minor alterations in the structure. Coues described seventeen genera or subgenera, and thirty-

six species or subspecies, of birds, most of which are still recognized. Three forms have been dedicated to his memory in their scientific names, and another in its vernacular appellation. Coues was a member, active or honorary, of numerous scientific societies, foreign and American. He was elected to the National Academy of Sciences when thirty-four years of age, being its youngest member.

Whatever later critics may think of his rather ornate prose, he was appraised by contemporaries as the finest writer among American scientists and his example stimulated others to do their best. The term, genius, is not misapplied to Coues, particularly with its usual implication of imbalance, which in his case occasionally led to impulsive or indiscreet actions, some of them tinged by an attitude akin to the "divinity of kings." Yet he won strong friendships, worked effectively for the common good, and greatly improved the science of ornithology and the art of zoological nomenclature.

## THE NORTH STAR AND THE DIPPER

(Continued from page 437)

to come, as they are today to those in the northern hemisphere and especially in its higher latitudes, the best known guides to the direction of the true north.

Polaris is in itself a most remarkable star. Not only is it a double star with a faint companion of the 9th magnitude. It is also one of that most noted and valuable type of physically variable stars known as galactic Cepheids. These stars have periods of light changes that range from one to 45 days, reoccurring with great regularity. The change that takes place within the star during its period of light change is of the nature of pulsations, or expansion and contraction of the star. A change in spectrum and surface temperature takes place during the period of light change. These stars are all super-giant yellow stars and are comparatively rare in space. In our galactic system only about twelve are bright enough to be seen without telescopic aid. One of these is Delta Cephei, a typical galactic Cepheid that gave its name to the class as a whole. These stars are very valuable because of a well-known relationship that exists between the period of light variation of the star and its true or absolute magnitude. Their luminosities, moreover, are so great that they may be detected in some of the nearest of the extra-galactic nebulae and in particular in the Great Andromeda Nebula.

The remarkable discovery made by Dr. Walter Baade, a member of the staff of the Mt. Wilson and Palomar Observatories, through his observations of the Great Andromeda Nebula with the 200-inch telescope within the past decade, that galactic Cepheids are  $1\frac{1}{2}$  magnitudes more luminous than they were formerly

supposed to be, has placed all stars of that type, and so all extragalactic nebulae in which they have been detected, twice as distant as they were formerly believed to be.

It follows that the Great Andromeda Nebula is about 1,600,000 light years distant from the earth, instead of 800,000 light years, the formerly estimated distance of this nearest of all extragalactic nebulae. As The Andromeda Nebula serves as a yardstick for finding the distances of other more distant extragalactic nebulae it follows that the scale of the universe itself is doubled. Other remarkable conclusions are to be drawn from this change in the scale of distances of objects exterior to our galaxy, but they are too numerous and varied to be even mentioned in this brief space. Their effect upon our concepts of the size, extent and age of the universe are of great importance and are receiving confirmation from investigations of other astronomers.

In October four planets Mercury, Venus, Mars and Saturn are in the southwestern evening sky. Mercury is at greatest eastern elongation on October 5, but poorly placed and invisible most of October as it is at inferior conjunction on October 29. Venus is at greatest brilliancy on October 11. It will be visible low in the southwest for a short time after sunset. Mars is still in Sagittarius and decreasing in brightness but still brighter than Vega. It is nearly due south at sunset and sets before midnight. Saturn in the southwestern evening sky is too near the sun to be seen, except for a short time early in the month. Jupiter is now in Gemini and rises about midnight and is near the meridian at sunrise.

## Bulletins

"Shortleaf Pine" thoroughly discusses this tree as a crop. The bulletin is written by Wilbur R. Mattoon and is published by the U. S. Department of Agriculture as Farmer's Bulletin No. 1671. Copies are available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. for twenty cents. . . "Foundation Plantings" describes effective planting schemes around the home. It is Circular 720 of the College of Agriculture, University of Illinois, Urbana, Illinois. . . From the Indiana Audubon Society, Noblesville, Indiana, comes a folder and map describing the Mary Gray Bird Sanctuary, located seven miles southwest of Connersville and fourteen miles southeast of Rushville, both in the Hoosier State. . . "Let's Get Down to Earth" is the interesting report of achievement in 1953 by Camp Fire Girls, Inc., 16 East 48th Street, New York 17, N. Y. . . "The Country Poet," published four times a year by Edwin P. Geauque, Sanbornville, New Hampshire, contains many charming poems, including several by poets who have contributed to the pages of *Nature Magazine*. Annual subscription is one dollar.

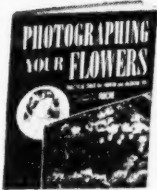
# PHOTOGRAPHING YOUR FLOWERS

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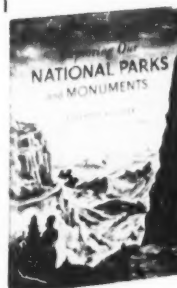
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# UNDER THE MICROSCOPE

By JULIAN D. CORRINGTON

## NOTEWORTHY SURVIVAL

THE scientist and the naturalist, professional or amateur, novice or expert, depends to a great extent upon books and periodicals, and it is thus to be expected that a business to supply these needs would arise. The specialized scientific book publisher and dealer is a very old institution and there are many of his kind, large and small, both in Europe and America. Foremost among such institutions and with worldwide fame and connections is the house of R. Friedländer & Sohn, of Berlin, Germany, still doing business in their one hundred and twenty-sixth year in spite of the disasters accompanying two great losing wars.

Raphael Friedländer started as a secondhand bookseller in 1823, and issued his first listing of scientific books in 1836. Each catalog thereafter contained more offerings in natural history, until the eighth, in 1847, embraced the whole field of zoology. In 1851 the eldest son, Dr. Julius Friedländer, a trained scientist and mathematician, was brought into partnership and in 1853, on the death of the father, the son returned from the United States, where he had planned to live as a teacher of mathematics, and took charge, directing the policy of the firm along lines ever more scientific. The catalogs became systematic and served as bibliographies of science subjects; so precise were these entries, in fact, that they were soon relied on everywhere as models for exact references.

Through the years this organization bought up great libraries and supplied others. Thus, significant portions of the science collections at Yale and Harvard were obtained from Friedländer. Important periodicals and special treatises were issued by the firm. To mention a few: *Naturae Novitates*, in its seventy-sixth year, *Zoologischer Jahresbericht*, *Annales mycologici*, *Das Tierreich*, and *Fauna and Flora of the Gulf of Naples*. On the death of Dr. Friedländer in 1882, the business passed into the hands of the Budy family, who have since carried on in the best tradition. Everything was at a standstill from 1914 to 1918. Again, after 1933, with Nazi limitations and finally a forced changing of the firm's name and resignation of those with any Jewish connections, the company had very hard sledding indeed, but the worst was yet to come, when fire destroyed the main office and then the Russians carted away some million volumes in spite of all protests. Frau Magda Budy and her daughter Erika carry on today, having obtained the expert, Walter Seuffer, as manager. In 1949 the firm

set up anew at Kuesbeckstrasse 15, Berlin-Charlottenburg 2, Germany, and the following year issued a catalog listing 2650 secondhand books. Others followed, and as before the firm took over the agency, sale, or publication of important serials.

The establishment is still in a state of reconstruction, but they strive hard to uphold the great traditions of their past, and it is good news to their many American friends and customers that the house of R. Friedländer & Sohn, who will secure for you that book you can not find anywhere else, or sell your library for you, or outfit a completely new one, is going to survive and continue, their motto still

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## NEW TESTA MICROSCOPE

AMERICA's third largest manufacturer of microscopes has produced a new instrument, the Testa Model A Microscope, with a magnification range intermediate between hand magnifiers and regulation compound models. It is handsome and unusually versatile in design. The optics consist of a 10X wide-field eyepiece and a triple-divisible achromatic objective that provides final magnifications of 15X, 45X, and 75X. With a long working distance and wide, flat field, these enlargements are admirably suited for inspection and study of a multitude of subjects in the arts and industries as well as in biology and geology. Minerals, gems, crystals, rocks, and fossils; assemblies, mountings, surface qualities, and physical measurements; documents, engravings, stamps, and coins; living and preserved small animals and plants and their parts, insects, parasites, embryos; whole mounts (as hydra) and sections of whole organisms (as earthworm) or the larger organs (as kidney or plant stem) — these are some of the materials for which the Model A is designed.

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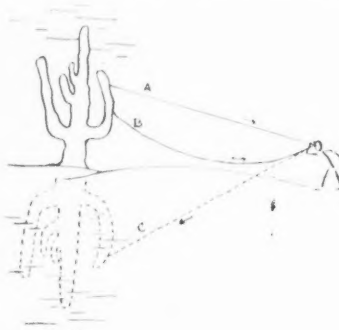
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## METEOROLOGICAL OPTICS

### 5. Mirage

ONE of the most fascinating of the many optical illusions provided on a grand scale by Nature is the *mirage* (L., *mirare*, to look at; F., *se mirer*, to look at one's self in a mirror, to reflect). There are rare and wonderful mirages that few have been privileged to witness, but everyone who has ridden down a highway on a hot day has seen the commonest of all mirages, in this day of paved roads, the "water on the road" phenomenon. Like the storied mirage of a lake of water on the burning sands of the desert that lures the lost prospector, dying of thirst, this apparent wet pavement of our modern macadam and concrete trails continually recedes as we approach, keeping ever ahead of us, so that we never succeed in catching up with the wet patch. *Life* magazine for April 5, 1954, p. 30-31 has a fine photograph in color of the illusory lake in the desert.



Under average or normal conditions the density of the atmosphere increases continuously as one approaches the earth's surface from above, being densest of all close to the ground, as described in our first installment of this series (May, 1954, issue). But hot surfaces warm the adjacent air to such an extent that it may become considerably less dense than the cooler layers above. For



the observer, as in our illustration, there will be direct rays of light (line A) traveling from the sky through cooler air, and by these the regular objects of the surroundings are seen, as the tall saguaro cactus of our picture. The more oblique rays (line B) will never reach the ground at all, but will be continually refracted so as to curve upward in meeting the eye. Objects seen by these rays will seem to lie along the course of a straight line (line C) in the direction from which the eye receives these rays, and so a virtual image of the sky appears to lie below the horizon. Inasmuch as human experience does not include seeing the "sky" lying on the ground, the mind interprets this apparition as water rather than sky, an impression heightened by the accompanying shimmering. Solid objects, as the saguaro tree, seem to lie in the water, and their images are always inverted. This also makes one think the image is that of water, with inverted reflections of shoreline objects, as trees or buildings.

The mirage must of course obey the law of refraction. If a light ray enters successively denser layers of atmosphere, it is bent toward the normal, which in this case is a perpendicular to the earth's surface. The apparent displacement of a star, as illustrated in our first article, is an example. With the mirage, however, very oblique rays are entering successively lighter layers of air and so are bent away from the normal; the curved line of light is concave upward, instead of concave downward as in the first example. Thus the illusion is made possible.

Under favorable conditions, the direct rays will bring normal vision of hills, houses, trees, and people, while the refracted rays will result in virtual inverted images of these objects, apparently mirrored in a lake. On hot nights, a similar highway mirage may be noted, the headlights of an approaching car being seen directly, and also refracted, ostensibly on or below the pavement, so that four lights seem to be coming on. The desert and the sea present the two most ideal situations for development of the more spectacular and fabulous form of mirage, differences in temperature and hence densities of portions of the atmosphere being more strongly marked. The ordinary "water on the road" mirage grows to huge proportions on hot summer highways in our southwestern deserts, motorists frequently experiencing the eerie sensation of riding at high speed on a section of road that seems to be on an island in a lake—an island that travels with the car, completely surrounded by sparkling water.

Mirages formed as, thus far described are inferior and inverted. It is possible, however, for them to be seen high in the sky and erect. Thus, the desert Arab is pictured as seeing a city in the sky, a city otherwise hidden from view by intervening hills or even located over the horizon, or the mariner sees a ship sailing

along through the sky. In such cases the air next to the ground or sea is colder than that immediately above, and the path of refracted rays of light is concave downward. How great a part total internal reflection may play in forming various mirages has never been determined. This is a subject yet to be discussed in the present series, as are those special cases of mirage known as looming and the fata morgana.

## BEGINNER'S PRIMER

**T**HE various sorts of bottleflies and related parasitic species have been placed in separate families by modern entomologists. They have somewhat differing habits and characteristics, yet typical members exhibit internal parasitism in the larval stage as a notable condition. As previously remarked, no one unfamiliar with the subject could possibly imagine that so thoroughly aerial a creature as a fly could become an internal parasite under any circumstances, yet the number of kinds that do so is very large, and the ways of attaining this status most devious and problematical.

In the Family Tachinidae, the Tachina Flies, are a large number of small to medium-sized parasites of insects, with the majority attacking caterpillars. The means of reaching the victim's body show wide variability. In some species, the adult females lay their eggs directly on the body of the host, so that when the muscoid larvae hatch they can bore into the host tissues. They breathe at first through a hole in the body wall of their victim, but later make internal connection with one of the tracheae. Some forms consume only expendable tissues, as fat and blood, and depart without killing the host, but mostly they attack vital organs and consume the host. There are species in which the female lays eggs on the food plant of the parasitized insect, which then eats the eggs incidentally. These hatch in the alimentary canal, the maggots then boring through to the body cavity to complete their development. In still others the eggs hatch on the foliage and the larvae then enter the host's body through external orifices.

This is the most beneficial of all fly families to the agriculturist, since the many kinds destroy immense numbers of caterpillars and other noxious insects. The adult flies are found around flowers and on vegetation where the victims are to be encountered. They are short and stout, usually black or brown, bristly, and with a large head. A number of tachinid flies have been introduced to America from foreign sources in an effort to control serious pests, such as the Japanese Beetle.

The Hypodermatidae are the Warble Flies, familiar vermin to anyone who has lived on farm or ranch in contact with cattle. The adult is large and robust and hairy, resembling a bee. *Hypoderma lineata*, an import from Europe that is now

# UNITRON

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cosmopolitan, is the Heel Fly or Warble Fly of cattle. It is strikingly marked, with four broken longitudinal stripes on the dorsum of the shiny black thorax, and prominent orange-red hairs at the end of the abdomen. Female flies oviposit on prone cattle, laying their eggs on the hairs of the flanks, legs, or tail, and on the heels of standing cows, the fly remaining on the ground and thus not irritating or warning the ill-fated bossy. When these eggs hatch, the larvae crawl down the hairs, burrow into the skin, and make their way through the subcutaneous connective tissues to the region of the esophagus, a journey requiring an average of four months, and possibly involving traveling through an entire cow, from rear heel to throat!

After some three more months, the maggots resume their wanderings, coming to rest beneath the integument of the back. Each larva bores a hole in the skin through which to breathe and excrete wastes. Now they attain large size and make swellings called *warbles*, resembling tumors and readily seen externally. In the spring the insect makes its exit through the breathing hole and drops to the ground, in which it pupates, emerging in about forty days as an adult fly.

These highly specialized pests not only cause great uneasiness among cattle—the related bomb fly, *H. bomx*, will stampede them—but also reduce both the meat and the milk supply and ruin the hides. Other species are known that attack deer, rabbits, and, accidentally, have caused intestinal myiasis in man.

In the Family Oestridae are flies similar in appearance to warble flies, that parasitize the nasal cavities and sinuses of sheep, goats, and their relatives, rarely even man. Some females oviposit, but the best-known species, *Oestrus ovis*, the Sheep Botfly or Gaddly, larviposits (deposits living larvae already hatched from eggs inside her body) within the nostrils of her victim. These larvae are formidable looking things, large and spiny, and make their way into the sinuses and horns, where they live on mucus. They cause a vertigo called "the staggers," and often the infestations result in death for the unfortunate mammal. After some ten months within the sheep's head the larvae are mature, drop to the ground to pupate, and emerge two months later as flies. Sheep and goats sense the danger from these devilish creatures and will run like mad when the female fly attempts to strike their nostrils in its rapid flight.

Large botflies, concerning which not so much is known, are comprised in the Family Cuterebridae, the larvae of which make subcutaneous tumors in various hosts. Of chief interest is the Human Botfly, *Dermatobia hominis*, possessing one of the most remarkable of all life histories, in that the female employs an assistant in order to reach a human being with her eggs. She oviposits upon mosquitoes, other flies, and ticks (Essig), and should

these external parasites or pests of man find a human victim, the botfly larvae leave their carrier and penetrate the human skin. The resultant swelling is large and painful, and undoubtedly such a sufferer knows all too well how a cow feels about its warbles. Nowhere is Nature more weirdly and ingeniously clever than in the domain of flies.

## BOOK REVIEW

### Ecology

**S**OMETHING new in the field of environmental biology has appeared, the *Fundamentals of Ecology*, by Eugene P. Odum, University of Georgia. Previous works commonly have confined their treatment to plants or to animals or have been encyclopaedic in character; the present volume is general and brief, an outline of principles and their applications. Part I covers basic concepts, including the ecosystem, habitat, niche, cycles, limiting factors, energy cycles, and the population levels of species, interspecies, and community. Part II uses the habitat approach, describing conditions in fresh-water, marine, and terrestrial ecology, and Part III is applied ecology, dealing with natural resources, public health, and human society.

Each topic is treated in a uniform manner aiming at system and brevity. There is first a *statement* of the subject or principle, then an *explanation* of what the statement means in familiar terms, and finally one or more *examples* or an *illustration*. In discussing paleoecology, for instance, the statement asserts that ecological principles have operated in the past as they do at present (Lyell's uniformitarianism), and the explanation takes up the way in which the science of paleoecology came into being, its basic assumptions, and the principle of radioactive dating in general and radiocarbon dating in particular. The illustration then describes and figures the way in which fossil pollens permit estimates of percentages of species of forest trees, plant succession, and probable climates of a region in Connecticut for the past ten or twelve thousand years.

The author's style makes easy and interesting reading of a subject that has not always been free from dullness in the past. There is an ample bibliography and many excellent tables, graphs, charts, maps, drawings, and photographs. This is a fine text for an introductory or one-semester course in ecology. Pp. xii, 384; frontisp., figs. 119, tables 19. W. B. Saunders Co., West Washington Square, Philadelphia 5, 1953. \$6.50.

### NEW RECORDINGS

**T**HE Laboratory of Ornithology, Department of Conservation, of Cornell University, has come up with some remarkable new recordings that will add important material to the library of the Nature lover and student of outdoor science.

Most recent is Vol. 2 of *American Bird Songs*, a L.P., 12-inch, double-faced disc that carries the voices of 51 species of birds. These were caught on tape recordings as received by a microphone at the focal point of a parabolic reflector, and represent endless hours of patient toil and a vast amount of travel and time and expense. On this single record, which equals an entire album of 78-rpm's, are the songs of familiar birds of gardens and shade trees, of the roadside, of lakes and marshes, and of twelve warblers. Not only will the practiced ornithologist wish to hear these songs time and again—and of course with a record he can have them whenever he wants them—but from them the novice can learn his bird music, a few species at a time, greatly speeding up his field learning experiences. Recorded by Professors P. P. Kellogg and Arthur A. Allen, these embalmed songs will forever stand as a tribute to their great work, under the Albert R. Brand Bird Song Foundation. \$7.75.

Another new record is *Western Bird Songs*, preserving the voices of ten songbirds unfamiliar to the ears of easterners: house finch or linnet, Bewick wren, spotted towhee, lazuli bunting, Gambel white-crowned sparrow, western meadow-lark, black-headed grosbeak, wren tit, western kingbird and Bullock oriole. These recordings were made by Dr. William R. Fish, a chemist with the Navy Ordnance Department, whose avocation is ornithology. Production is by Drs. Kellogg and Allen, at Cornell, with Dr. Allen speaking in introduction to each avian soloist. This is a fine record that should be very popular; it is a 10-inch, double-faced, 78-rpm platter. \$2.50.

*Voices of the Night* is a revision of the earlier album of the same name, recording the trills, croaks, and songs of frogs and toads. Eight new species have been added and the whole issued as a single L.P., 12-inch, double-faced record, in many ways the most remarkable of all the productions of Drs. Kellogg and Allen. One never tires of listening to the intricate, varied and amusing voices of the little people who wear green dinner jackets. We think this disc is technically the best of all and that it is definitely a must for all Nature libraries. \$6.75.

Order any of these fine records from the American Nature Association, 1214 16th St., N. W., Washington, D. C.

### SONGS FOR THE LABORATORY

SAURS

Lee S. Roberts

Smiles

There were saurs that flew the skyways  
There were saurs that swam the seas.  
There were saurs in all Jurassic byways  
Like the Brontosaurus as tall as trees.  
There were dinosaurs of bulk gigantic  
And a few whose length has been debunked,  
But the reason saurs are so romantic,  
Is the fact that they're all defunct.



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interest every citizen can and should take in the future of our children and the needs of our schools.

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